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MAY 1978 Number 405 - Part I

P-A STACKS
JUN 15 1978

Solar-Geophysical Data prompt reports

Data for April -- March 1978

Explanation of Data Reports Issued as Number 402 (Supplement) February 1978

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ERRATA PAGE 145

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Solar - Geophysical Data

NO. 405 MAY 1978

Part I (Prompt Reports)

DATA FOR
APRIL 1978
MARCH 1978

NATIONAL GEOPHYSICAL AND SOLAR - TERRESTRIAL DATA CENTER
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To standardize referencing these reports in the open literature, the following format is recommended:

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SOLAR-GEOPHYSICAL DATA

No. 405

Issued in two parts

Helen E. Coffey, Editor

J. Virginia Lincoln, Director
Solar-Terrestrial Data Services Division

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A = Part I, B = Part II.

---- = no data available.
blank = data not yet received.

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ALERT PERIODS

INTERNATIONAL URSIGRAM AND WORLD DAYS SERVICE

APRIL 1978

PRESTO MESSAGES (THE RAPID REPORT OF MAJOR EVENTS).

07 APRIL 1978, BOULDER 07/2130Z TENFLARE 190 FLUX UNITS 07/2017Z DURATION SIX MINUTES.
08 APRIL 1978, BOULDER 08/0149Z SOFLARE X1/1N N19W02 08/0123Z DURATION 106 MINUTES. TENFLARE 260 FLUX UNITS 08/0134Z DURATION 114 MINUTES.
10 APRIL 1978, BOULDER 10/1500Z TENFLARE 200 FLUX UNITS 10/1053Z DURATION 13 MINUTES
11 APRIL 1978, BOULDER 11/0245Z STRONG MAGSTORM IN PROGRESS. BEGAN 10/2100Z.
11 APRIL 1978, BOULDER 11/1730Z POLAR CAP ABSORPTION BEGAN AT 11/1600Z 2dB ABSORPTION PROTON EVENT BEGAN AT 11/1530Z 10 PROTONS /cm^2/sec/ster AT 10 MeV AT 11/1530Z.
11 APRIL 1978, BOULDER 11/1435Z SOFLARE X2/2B N19W57 14/1334Z IN PROGRESS. TENFLARE 1400 FLUX UNITS 14/1336Z IN PROGRESS.
23 APRIL 1978, BOULDER 23/1530Z TENFLARE 4300 FLUX UNITS 23/0424Z DURATION 223 MINUTES. BRIGHT LOOPS ON NE LIMB EXTENDED TO AT LEAST 0.1R.
25 APRIL 1978, BOULDER 25/1640Z SOFLARE M2/1B N23E71 25/1542Z DURATION 29 MINUTES. TENFLARE 6700 FLUX UNITS 25/1541Z DURATION 5 MINUTES.
28 APRIL 1978, BOULDER 28/0214Z SOFLARE C8 N27E46 28/0010 DURATION 16 MINUTES.
28 APRIL 1978, BOULDER 28/0214Z TENFLARE 280 FLUX UNITS 28/0010Z DURATION 7 MINUTES.
28 APRIL 1978, BOULDER 28/1430Z SOFLARE X4/4B N22E41 28/1308Z DURATION 40 MINUTES. TENFLARE 24,000 FLUX UNITS 28/1308Z IN PROGRESS.
29 APRIL 1978, BOULDER 29/2010Z SOFLARE X3/3B N22E19 29/1854Z DURATION 50 MINUTES. TENFLARE 3580 FLUX UNITS 29/1954Z DURATION 100 PLUS.
30 APRIL 1978, BOULDER 30/1727Z SOFLARE X2/3B N20E11 30/1439Z DURATION 41 MINUTES. TENFLARE 1200 FLUX UNITS 30/1420Z IN PROGRESS.

SUMMARY OF THE GEOALERT WWA MESSAGES

Message serial number	Date of issue	Date of obser-vation	Wolf number	10 cm solar flux	A index	Active Regions: Location Lat-Long	No. of Flares: Total	M	X	Outstanding events	Forecasts: Date	Location Lat-Long	Desc*	Alert Situations
91	1	31	65	125	05	S26W80	0	0	0		1	S26W80	Q	SOLQUIET MAGQUIET
						S17E47	0	0	0			S17E47	Q	
						S19E37	0	0	0			S19E37	Q	
						N2BE53	1	0	0			N2BE53	Q	
						N21E72	0	0	0			N21E72	Q	
92	2	1	121	130	10	N37W61	0	0	0		2	N37W61	Q	SOLQUIET MAGQUIET
						S17E34	1	0	0			S17E34	Q	
						S19E24	0	0	0			S19E24	Q	
						N12W37	0	0	0			N12W37	Q	
						N30E42	0	0	0			N30E42	Q	
						N19E68	0	0	0			N19E68	Q	
						N27W43	0	0	0			N27W43	Q	
						N23E30	0	0	0			N23E30	Q	
						N15E66	0	0	9			N15E66	Q	
93	3	2	97	130	08	S14E21	0	0	0		3	S14E21	Q	SOLQUIET MAGQUIET
						S18E10	0	0	0			S18E10	Q	
						N29E24	3	0	0			N29E24	Q	
						N22E55	5	0	0			N22E55	Q	
						N24W57	0	0	0			N24W57	Q	
						N16E52	0	0	0			N16E52	Q	
						N15W41	0	0	0			N15W41	Q	
94	4	3	129	135	17	S13E08	0	0	0		4	S13E08	Q	SOLQUIET MAGALERT MINOR 04
						S18W03	0	0	0			S18W03	Q	
						N31E10	0	0	0			N31E10	Q	
						N22E42	0	0	0			N22E42	Q	
						N25W74	0	0	0			N25W74	Q	
						N17E40	0	0	0			N17E40	Q	
						N12W53	0	0	0			N12W53	Q	
						S27E67	0	0	0			S27E67	Q	
95	5	4	118	146	20	S14W06	0	0	0		5	S14W06	Q	SOLQUIET MAGALERT MINOR 05
						S18W13	0	0	0			S18W13	Q	
						N30W07	0	0	0			N30W07	Q	
						N21E29	4	0	0			N21E29	Q	
						N16E26	0	0	0			N16E26	Q	
						N13W67	0	0	0			N13W67	Q	
						S26E57	2	0	0			S26E57	Q	
						N17E69	1	0	0			N17E69	Q	
96	6	5	140	148	16	S15W19	0	0	0		6	S15W19	Q	SOLQUIET MAGNIL
						S17W24	0	0	0			S17W24	Q	
						N31W16	0	0	0			N31W16	Q	
						N21E16	8	0	0			N21E16	E	
						N21W25	0	0	0			N21W25	Q	
						N16E12	0	0	0			N16E12	Q	
						S26E44	0	0	0			S26E44	Q	
						N17E54	0	0	0			N17E54	Q	
						S28E70	0	0	0			S28E70	Q	
						N18E67	0	0	0			N18E67	Q	
97	7	6	100	149	03	N21E04	6	0	0		7	N21E04	E	SOLQUIET MAGQUIET
						N23N39	0	0	0			N23N39	Q	
						N15W00	0	0	0			N15W00	Q	
						S27E31	3	0	0			S27E31	Q	
						N17E39	0	0	0			N17E39	Q	
						S27E60	0	0	0			S27E60	Q	
						N18E56	0	0	0			N18E56	Q	
						N16E32	0	0	0			N16E32	Q	
						N33W12	0	0	0			N33W12	Q	
						S29E67	0	0	0			S29E67	Q	
98	8	7	154	147	04	N21W09	5	1	0	TENFLARE 190 F.U.	8	N21W09	C.P.	SOLALERT 08/XX MAGQUIET
						N21W52	0	0	0	BEGAN AT 07/2017Z		N21W52	Q	
						S26E18	0	0	0	DURATION 6 MINUTES.		S26E18	Q	
						N17E27	0	0	0	1B FLARE AT N19W07		N17E27	Q	
						S28E46	0	0	0			S28E46	Q	
						S33E74	0	0	0			S33E74	Q	
						N18E44	0	0	0			N18E44	Q	
						N15E16	0	0	0			N15E16	Q	
						S30E54	0	0	0			S30E54	Q	
99	9	8	224	148	04	N20W65	0	0	0	SOFLARE IN/R1	9	N20W65	Q	SOLALERT 09/XX MAGALERT 09/XX
						N20W21	2	0	1	N19W02 08/0123Z		N20W21	C.P.	
						N20W65	5	0	0	106 MINUTES		N20W65	C.A.	
						S27E05	1	0	0	TENFLARE 260 F.U.		S27E05	Q	
						N17E13	0	0	0	08/0134Z 114 MIN.		N17E13	Q	
						S29E34	0	0	0			S29E34	Q	
						N18E29	0	0	0			N18E29	Q	
						N16E01	0	0	0			N16E01	Q	
						N33W32	0	0	0			N33W32	Q	
						S31E40	2	0	0			S31E40	E	
						S32E62	1	0	0			S32E62	Q	
						N16E75	1	0	0			N16E75	D.A.	
						N18N13	0	0	0			N18N13	Q	
						S28E17	0	0	0			S28E17	Q	

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Apr 78

ALERT PERIODS

INTERNATIONAL URSIGRAM AND WORLD DAYS SERVICE

APRIL 1978

SUMMARY OF THE GEOALERT WWA MESSAGES

Message serial number	Date of issue	Date of observation	Wolf number	10 cm solar flux	A index	Active Regions: Location Lat-Long	No. of Flares: Total	M	X	Outstanding events	Forecasts: Date	Location Lat-Long	Desc*	Alert Situations
100	10	9	261	156	06	S19W79	0	0	0		10	S19W79	Q	SOLALERT 10/XX MAGALERT 10/12
						N20W34	6	0	0			N20W34	A	
						N20W78	3	0	0			N20W78	E	
						S27W09	0	0	0			S27W09	Q	
						N17E01	0	0	0			N17E01	Q	
						S28E21	0	0	0			S28E21	Q	
						N18E15	0	0	0			N18E15	Q	
						N16W10	0	0	0			N16W10	Q	
						N33W53	0	0	0			N33W53	Q	
						S28E27	0	0	0			S28E27	Q	
						S32E51	0	0	0			S32E51	Q	
						N18E68	4	2	0			N18E68	A	
						S27E06	0	0	0			S27E06	Q	
101	11	10	179	155	17	N21W48	6	0	0	TENFLARE 200 F.U.	11	N21W48	C.P.	SOLALERT 10/XX MAGALERT 10/12
						S27W22	4	0	0	10/1053Z 13 MIN.		S27W22	A	
						N16W09	0	0	0	STRONG MAGSTORM IN		N16W09	Q	
						S28E07	0	0	0	PROGRESS BEGAN		S28E07	Q	
						N18E03	0	0	0	10/2100Z		N18E03	Q	
						N14W22	0	0	0			N14W22	Q	
						S29E14	0	0	0			S29E14	Q	
						S32E35	0	0	0			S32E35	Q	
						N16E57	8	1	0			N16E57	A	
						N20E67	0	0	0			N20E67	Q	
102	12	11	168	180	35	N19W62	8	0	1	SOFLARE X2/2B	12	N19W62	C.P.	SOLALERT 12/XX MAGALERT 12/15
						S27W38	2	0	0	N19W57 14/1334Z		S27W38	Q	
						N18W22	0	0	0	TENFLARE 1400 F.U.		N18W22	Q	
						S27W04	0	0	0	14/1336Z PCA BEGAN		S27W04	Q	
						N15W34	0	0	0	11/1600 3.2dB MAX		N15W34	Q	
						S33E23	0	0	0	AT 11/1630Z PROTON		S33E23	Q	
						N16E40	2	0	0	EVENT BEGAN AT 11/		N16E40	A	
						N17E53	2	1	0	1530Z 10 PROTONS		N17E53	A	
						S45E69	0	0	0	AT 11/1530Z		S45E69	Q	
103	13	12	169	155	23	N20W75	2	1	0	PROTON EVENT ENDED	13	N20W75	E	SOLALERT 13/14 MAGALERT 13/14
						S26W50	1	0	0	12/1400Z PCA ENDED		S26W50	Q	
						S28W15	0	0	0	12/1400Z 3.8 dB		S28W15	Q	
						S35E09	0	0	0	MAX.		S35E09	Q	
						N15E24	2	0	0			N15E24	E	
						N18E41	7	0	0			N18E41	E	
						S44E59	0	0	0			S44E59	Q	
						N18E14	0	0	0			N18E14	Q	
104	14	13	212	145	13	N19W88	5	0	0		14	N19W88	Q	SOLALERT MAGALERT
						S28W63	0	0	0			S28W63	Q	
						S27W28	2	0	0			S27W28	E	
						S32W00	0	0	0			S32W00	Q	
						N19E09	3	0	0			N19E09	E	
						N16E24	1	0	0			N16E24	E	
						S45E48	0	0	0			S45E48	Q	
						N20E02	0	0	0			N20E02	Q	
						S33W17	0	0	0			S33W17	Q	
						S20E11	0	0	0			S20E11	Q	
105	15	14	192	135	34	S26W77	0	0	0		15	S26W77	Q	SOLALERT MAGALERT
						S28W42	0	0	0			S28W42	Q	
						S34W14	0	0	0			S34W14	Q	
						N14W03	10	0	0			N14W03	E	
						N17E12	2	0	0			N17E12	E	
						S44E37	0	0	0			S44E37	Q	
						N20W10	0	0	0			N20W10	Q	
						S20W02	0	0	0			S20W02	Q	
						N18E22	0	0	0			N18E22	Q	
106	16	15	235	140	14	S29W49	0	0	0		16	S29W49	Q	SOLALERT MAGNIL
						S35W24	0	0	0			S35W24	Q	
						N14W17	7	1	0			N14W17	E	
						N17W00	3	0	0			N17W00	E	
						S43E27	1	0	0			S43E27	Q	
						N19W28	1	0	0			N19W28	Q	
						S20W15	0	0	0			S20W15	Q	
						N18E05	0	0	0			N18E05	Q	
						N32E60	0	0	0			N32E60	Q	
						N17E64	2	0	0			N17E64	Q	
						S31E72	0	0	0			S31E72	Q	
						S27W84	1	0	0			S27W84	Q	
107	17	16	145	137	07	N17W66	1	0	0		17	N17W66	Q	SOLALERT 17/XX MAGQUIET
						N17W30	3	0	0			N17W30	E	
						N17W13	0	0	0			N17W13	Q	
						S43E15	0	0	0			S43E15	Q	
						N20W41	1	0	0			N20W41	Q	
						S19W24	1	0	0			S19W24	Q	
						N32E48	1	0	0			N32E48	Q	
						N17E52	3	0	0			N17E52	A	
						S29E64	0	0	0			S29E64	Q	

ALERT PERIODS

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SUMMARY OF THE GEOALERT WWA MESSAGES

Message serial number	Date of issue	Date of observation	Wolf number	10 cm solar flux	A index	Active Regions: Location Lat-Long	Flares: Total	Flares: M	Flares: X	Outstanding events	Forecasts: Date	Forecasts: Location Lat-Long	Forecasts: Desc*	Alert Situations
108	18	17	168	132	05	N17W79	0	0	0		18	N17W79	Q	SOLALERT 18/XX MAGQUIET
						N15W44	3	0	0			N15W44	A	
						N18W26	0	0	0			N18W26	Q	
						S43E03	1	0	0			S43E03	Q	
						N21W55	0	0	0			N21W55	Q	
						S18W37	0	0	0			S18W37	Q	
						N32E35	0	0	0			N32E35	Q	
						N17E39	1	0	0			N17E39	Q	
						S28E55	0	0	0			S28E55	Q	
						N16E61	0	0	0			N16E61	Q	
						S32E46	0	0	0			S32E46	Q	
						S18E85	0	0	0			S18E85	Q	
109	19	18	174	133	12	N15W59	2	1	0		19	N15W59	C.A.	SOLALERT 19/20 MAGALERT 20
						N18W42	0	0	0			N18W42	Q	
						S44W08	0	0	0			S44W08	Q	
						N20W73	0	0	0			N20W73	Q	
						S19W51	0	0	0			S19W51	Q	
						N32E25	0	0	0			N32E25	Q	
						S30E46	1	0	0			S30E46	Q	
						S30E33	2	0	0			S30E33	A	
						S20E71	0	0	0			S20E71	Q	
						N21E51	0	0	0			N21E51	Q	
110	20	19	159	145	17	N13W70	0	0	0		20	N13W70	C.A.	SOLALERT 20/XX MAGALERT 20/XX
						N17W52	0	0	0			N17W52	Q	
						N40W24	0	0	0			N40W24	Q	
						S43W19	0	0	0			S43W19	Q	
						N30E06	1	0	0			N30E06	Q	
						S29E18	1	0	0			S29E18	Q	
						S27E32	0	0	0			S27E32	Q	
						N21E34	10	0	0			N21E34	E	
						N16E35	6	0	0			N16E35	E	
						S19E54	1	0	0			S19E54	Q	
111	21	20	194	139	15	N13W76	3	0	0	MINOR SATELLITE	21	N13W76	Q	SOLNIL MAGALERT MINOR RECURRENCE
						N17W67	1	0	0	PROTON EVENT		N17W67	Q	22/24
						N19W51	0	0	0	20/0420Z TO 20/		N19W51	Q	
						S43W32	0	0	0	1440Z MAX FLUX		S43W32	Q	
						S29E05	0	0	0	20/0625Z OF 21		S29E05	Q	
						N17E11	0	0	0	P/cm^{2}sec/ster.		N17E11	Q	
						S28E21	0	0	0			S28E21	Q	
						N21E23	4	0	0			N21E23	Q	
						N17E24	8	0	0			N17E24	Q	
						S20E42	0	0	0			S20E42	Q	
112	22	21	223	142	09	N19W75	3	0	0		22	N19W75	E	SOLQUIET MAGALERT 22/24
						N20W62	0	0	0			N20W62	E	
						N17W00	0	0	0			N17W00	Q	
						S44W43	0	0	0			S44W43	Q	
						N18E15	0	0	0			N18E15	Q	
						S29W06	0	0	0			S29W06	Q	
						N21E09	2	0	0			N21E09	E	
						S30E09	0	0	0			S30E09	Q	
						N16E12	1	0	0			N16E12	Q	
						S20E32	0	0	0			S20E32	Q	
113	23	22	199	145	07	N17W81	1	0	0		23	N17W81	Q	SOLQUIET MAGALERT 23/24
						S43W53	0	0	0			S43W53	Q	
						S30W03	0	0	0			S30W03	Q	
						N17W02	3	0	0			N17W02	Q	
						S29W14	0	0	0			S29W14	Q	
						S19E19	0	0	0			S19E19	Q	
						N21W03	3	0	0			N21W03	E	
						N19W72	2	0	0			N19W72	E	
						N18W31	2	0	0			N18W31	Q	
						N25E21	0	0	0			N25E21	Q	
114	24	23	170	161	16	S44W64	0	0	0	MAJOR FLARE REPORT-	24	S44W64	Q	SOLALERT 24/XX MAGALERT 24/25
						S30W16	0	0	0	ED AT 23/0455Z		S30W16	Q	
						N14W13	1	0	0	BEYOND EAST LIMB		N14W13	Q	
						S30W24	0	0	0	AT NE 25. ACCOM-		S30W24	Q	
						S21E04	1	0	0	PANIED BY M7 X-RAY		S21E04	Q	
						N21W17	5	1	0	BURST. TENFLARE		N21W17	A	
						N18W86	1	0	0	4300 F.U. 23/0424Z		N18W86	Q	
						N18W43	1	0	0	DURATION 223 MIN.		N18W43	Q	
						N22E06	1	0	0			N22E06	Q	
						N25E90						N25E90	C.A.	
115	25	24	150	158	25	S44W74	0	0	0		25	S44W74	Q	SOLALERT 25/XX MAGALERT 25/XX
						S29W29	0	0	0			S29W29	Q	
						N15W26	3	0	0			N15W26	E	
						S30W35	0	0	0			S30W35	Q	
						S20W08	1	0	0			S20W08	Q	
						N21W30	1	0	0			N21W30	E	
						N18W57	0	0	0			N18W57	Q	
						N23W07	2	0	0			N23W07	Q	
						N27E83	0	0	0			N27E83	C.A.	

ALERT PERIODS

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SUMMARY OF THE GEOALERT WWA MESSAGES

Message serial number	Date of issue	Date of obser-vation	Wolf number	10 cm solar flux	A index	Active Regions				Outstanding events	Forecasts			Alert Situations
						Location Lat-Long	No. of Flares Total	M	X		Date	Location Lat-Long	Desc*	
116	26	25	284	169	12	S31W38	1	0	0	SOFLARE M2/1B	26	S31W38	Q	SOLALERT 26/XX MAGNIL
						N15W38	0	0	0	N23E71 25/1542Z		N15W38	E	
						S32W49	4	0	0	DURATION 29 MIN.		S32W49	E	
						S21W20	0	0	0	TENFLARE 6700 F.U.		S21W20	Q	
						N20W43	0	0	0	25/1541Z DURATION		N20W43	E	
						N17W68	1	0	0	5 MIN.		N17W68	Q	
						N23W20	0	0	0			N23W20	Q	
						N26E72	6	1	0			N26E72	C.A.	
						N30E11	0	0	0			N30E11	Q	
						S22E30	0	0	0			S22E30	Q	
117	27	26	146	165	18	N15W49	1	0	0		27	N15W49	Q	SOLALERT MAGQUIET
						S30W62	3	0	0			S30W62	E	
						N21W52	3	0	0			N21W52	E	
						N24W30	0	0	0			N24W30	Q	
						N23E56	11	1	0			N23E56	E	
						N29W03	0	0	0			N29W03	Q	
						N22E75	0	0	0			N22E75	Q	
						S22E15	0	0	0			S22E15	Q	
118	28	27	130	170	11	N17W65	3	0	0		28	N17W65	E	SOLALERT MAGQUIET
						S30W75	0	0	0			S30W75	Q	
						N20W67	1	0	0			N20W67	E	
						N24E43	14	0	0			N24E43	E	
						N28W16	0	0	0			N28W16	Q	
						N22E62	0	0	0			N22E62	Q	
119	29	28	119	197	13	N14W80	1	0	0	SOFLARE C8 N27E46	29	N14W80	Q	SOLALERT MAGALERT
						N21W78	1	0	0	28/0010Z DURATION		N21W78	Q	
						N24E29	7	0	1	16 MIN. TENFLARE		N24E29	A	
						N28W29	0	0	0	280 F.U. 28/0010Z		N28W29	Q	
						N22E50	0	0	0	DURATION 7 MIN.		N22E50	Q	
										SOFLARE X4/4B N22				
										E41 28/1308Z DURA-				
										TION 40 MIN. TEN-				
										FLARE 24,000 F.U.				
										28/1308Z DURATION				
										106 MIN.				
120	30	29	130	183	04	N22E19	10	0	1	SOFLARE X3/3B N22	30	N22E19	C.P.	SOLALERT 30/02 MAGALERT 30/XX
						N27W42	0	0	0	E19 29/1854Z DURA-		N27W42	Q	
						N41E23	10	0	0	TION 50 MIN. TEN-		N41E23	Q	
						N36W34	0	0	0	FLARE 3580 F.U.		N36W34	Q	
										29/1854Z DURATION				
										100 PLUS				
121	01	30	162	185	30	N30W61	0	0	0	SOFLARE X2/3B	01	N30W61	Q	PROTON FLARE ALERT 01/XX MAGALERT
						N28W51	0	0	0	N20E11 30/1439Z		N28W51	Q	01/XX
						N21E06	9	3	1	DURATION 41 MIN.		N21E06	P	
						N23E25	1	0	0	TENFLARE 2900 F.U.		N23E25	Q	
										30/1437Z DURATION				
										143 MIN. PCA BEGAN				
										29/1030Z MAX 9.8				
										DB at 30/1745Z.				
										IN PROGRESS SSC				
										30/0952Z				

* Q=Quiet E=Eruptive A=Active P=Proton C=Caution D=Doubtful O.G.=Other Groups MF=Major Flare

RELATIVE SUNSPOT NUMBERS

ZURICH, R_Z

	1977 FINAL								1978 PROVISIONAL			
DAY	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR
1	15	44	42	17	22	43	44	20	84	128	93	70
2	14	43	45	15	29	37	40	20	88	120	83	68
3	22	43	42	24	29	47	25	31	102	131	95	71
4	23	49	39	19	25	47	22	47	102	138	103	75
5	18	40	40	23	20	48	25	58	73	137	76	94
6	16	39	40	26	26	55	27	58	69	129	67	92
7	12	41	25	28	25	57	34	55	42	121	90	88
8	19	38	20	25	18	52	27	45	36	89	99	105
9	25	33	17	30	30	47	31	58	36	94	85	126
10	29	29	23	26	40	38	25	75	15	96	92	111
11	34	27	9	23	45	28	26	71	18	95	85	109
12	35	22	8	29	51	33	27	62	26	92	78	107
13	26	20	10	40	48	53	28	44	26	93	65	93
14	33	25	7	40	47	48	31	37	36	82	62	75
15	26	8	8	42	53	54	39	41	38	59	72	61
16	25	8	0	38	56	53	49	39	23	64	70	85
17	20	8	0	36	53	51	51	29	24	56	66	99
18	12	21	0	40	60	50	54	33	14	55	72	100
19	0	33	7	35	59	54	52	40	8	53	64	107
20	11	21	8	33	60	54	38	23	7	52	51	115
21	14	28	8	33	58	42	32	23	20	63	77	112
22	7	40	23	38	42	35	28	17	30	74	82	109
23	7	57	30	15	41	30	24	23	43	69	85	105
24	7	60	38	19	48	29	18	31	37	78	82	102
25	0	74	42	25	46	28	10	35	32	94	78	139
26	7	71	42	34	49	30	9	41	47	86	53	115
27	13	74	37	38	54	38	14	50	69	79	50	90
28	16	65	26	36	61	37	9	45	79	88	49	75
29	20	50	16	40	64	42	10	58	90		48	72
30	30	45	10	36	60	45	23	64	104		44	70
31	48		8	31		52		67	118		70	
MEAN	18.6	38.5	21.4	30.1	44.0	43.8	29.1	43.2	49.3	89.8	73.5	94.7

1977 yearly mean = 27.5

DAILY SOLAR FLUX AT 2800 MHz
OTTAWA ARO

FLUX ADJUSTED TO 1 A.U., S_a

	1977								1978			
DAY	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR
1	77.2	88.9	102.0	83.8*	83.1	93.8*	94.4	88.4	126.9*	139.1	136.3	130.0
2	78.5	90.9*	100.7	82.8	84.2	93.2	93.6	91.2	133.9	152.6	141.1	129.8
3	81.9	93.0*	97.4	82.3	87.2	97.4	90.4	93.7	138.2	156.6*	146.6	134.5
4	81.4*	94.2	94.0	82.9*	84.2	98.8	89.4	95.9	124.8	154.0	148.4	143.3*
5	79.6	98.2*	88.0*	86.4	85.6	104.0*	90.6	96.9	119.2	159.0	154.5	146.7*
6	78.5	98.6	90.2	88.2	84.9	103.5	91.1	102.0*	118.7*	156.1	162.8	145.3*
7	77.1*	92.8	85.2	86.9	89.3	105.5	90.2	105.5	111.6	157.3	165.2	146.9
8	77.9	91.9*	82.1	85.1	91.6	103.8	90.3	106.7	102.8	157.0*	168.7	148.6
9	83.6	90.9	79.0	85.9	95.9	100.7	91.1	112.6*	97.0	155.2	183.7	156.1
10	80.8	89.2*	76.9	87.2	99.8	96.4	93.1	114.7	93.5	148.7	179.1	155.4
11	80.8	87.2	76.2	87.6	104.6	95.3	94.9	107.4	93.1	154.2	175.2	162.8*
12	79.7	83.3	75.8	86.5	107.8	100.8	91.4	111.8	92.1	159.0	169.8	156.2
13	81.5	84.2	77.8	89.8	112.9	98.5	94.0	100.6	90.3	151.2	160.9	145.6
14	84.8	82.3	76.8	87.5	116.2	98.9	97.9	93.7*	88.6	148.4	160.5	139.1
15	85.0	82.3	76.8	86.9	120.7	98.2	97.9	92.5	89.6	136.8	154.2	141.4
16	85.1	81.4	76.9	87.3	120.4	96.8	95.9	92.5	86.4	130.2	143.3	137.6
17	84.1	82.4	76.5	87.1	120.6	94.9	100.4	91.1	83.8	125.9	135.4	133.4
18	82.9	84.3	76.9	88.6	120.5	95.4	102.8*	93.6	84.7	124.9	132.3	134.1
19	82.1	85.2	76.9	87.0	104.5	105.0	99.2	91.0	85.4	119.1	128.1	139.5*
20	81.3	88.9	80.1	88.7	100.8	99.6*	95.7*	88.7	87.0	122.2	125.3	138.1
21	81.4	92.4	81.7	90.8	104.9*	98.6*	92.6	87.8	91.4	122.2	118.2	138.4*
22	82.9	98.8*	83.1	89.6	102.4	93.9	89.3	89.9	96.9	127.7	117.0	146.4
23	82.4	99.4	85.8	86.8	99.3	87.3	88.0	91.2	99.6	131.8	116.4	162.9
24	79.2	107.4	84.8	86.0	100.6	88.3	86.7	93.9	100.4	135.6	117.5	159.8
25	77.4	113.8	86.0	87.7	98.8	88.1	84.7	96.3	103.3	139.3	116.2	159.1*
26	76.8	120.7	86.0	86.4	99.4	88.6	84.1	99.3	112.7	134.8	112.5	166.7
27	77.9	115.9*	85.4	85.4	100.8	88.5	83.8	98.3	116.4	137.5	114.1	172.8
28	79.1	113.4	87.5	82.4	100.0	90.3*	85.6	98.9	127.7*	135.4	112.7	176.6*
29	81.7	111.9	86.7	86.1	99.4	90.3	85.6	105.6*	132.2*		111.1	185.2
30	89.9	106.9	84.1	85.5	97.7	94.9	85.3	114.7	134.9		115.4*	182.1*
31	92.8		88.4	84.7		95.9		120.2	133.3*		124.5	
MEAN	81.4	94.5	83.7	86.4	100.9	96.3	91.6	98.9	106.1	141.8	140.3	150.5

* adjusted for burst

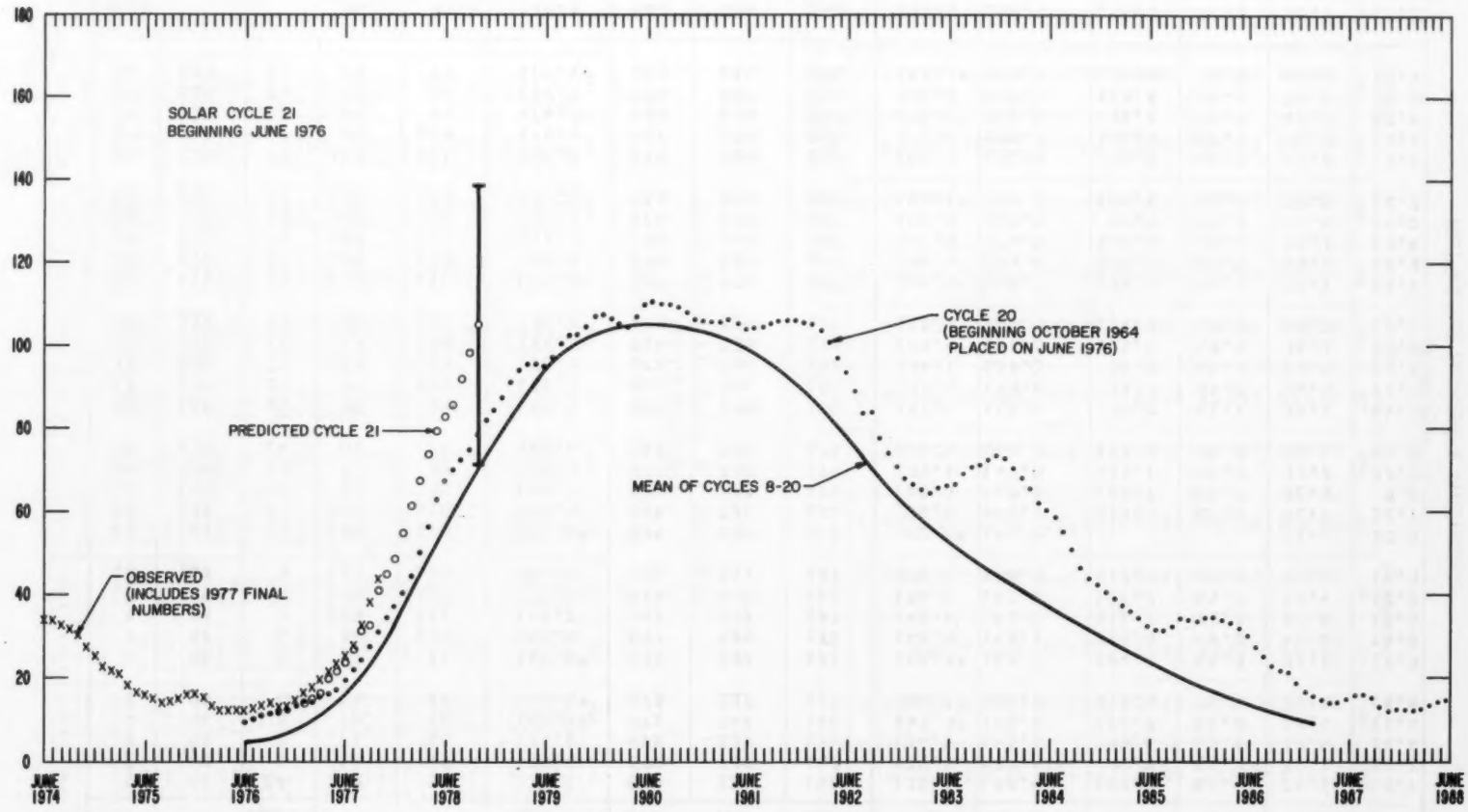
DAILY SOLAR INDICES

APRIL 1978

APR 1978	YEAR DAY	BARTELS 27-DAY CYCLE NUMBER	SUNSPOT NUMBERS		OBSERVED FLUX	SOLAR FLUX ADJUSTED TO 1 A.U.								
			R_Z	$R_{A'}$	OTTAWA 2800	AFGL 15400	AFGL 8800	AFGL 4995	OTTAWA 2800	AFGL 2695	AFGL 1415	AFGL 606	AFGL 410	AFGL 245
1	91	27	70	55	130.1	574	324	166	130.0	138.2	100.9	65.4	24.8	10.7
2	92	1	68	59	129.9	572	330	167	129.8	137.4	96.0	65.3	30.1	11.2
3	93	2	71	63	134.5	575	333	174	134.5	143.5	99.6	64.8	32.6	10.4
4	94	3	75	72	143.2*	571	341	186	143.3*	156.6	106.2	68.0	33.4	11.4
5	95	4	94	83	146.6*	578	337	189	146.7*	158.2	111.4	70.4	34.4	10.8
6	96	5	92	81	145.0*	586	332	181	145.3*	161.0	104.3	66.9	31.0	10.9
7	97	6	88	104	146.6	557	326	176	146.9	158.1	110.0	80.2	41.0	14.3
8	98	7	105	112	148.2	568	328	183	148.6	160.5	111.7	70.0	32.9	15.4
9	99	8	126	119	155.6	585	343	188	156.1	167.2	112.2	69.2	33.4	12.2
10	100	9	111	120	154.8	584	341	187	155.4	165.3	112.0	66.3	31.2	10.9
11	101	10	109	123	162.0*	595	355	204	162.8*	184.2			31.4	12.3
12	102	11	107	116	155.4	584	331	186	156.2	163.7	113.4	67.3	31.7	12.7
13	103	12	93	85	144.7	570	322	176	145.6	149.5	105.7	65.7	32.9	9.2
14	104	13	75	92	138.3	577	332	175	139.1	147.9	104.1	68.0	33.2	37.9
15	105	14	61	76	140.4	582	335	174	141.4	150.0	102.1	65.5	36.1	41.9
16	106	15	85	89	136.6	572	329	174	137.6	145.6	99.2	61.7	35.1	24.9
17	107	16	99	100	132.3	562	321	164	133.4	139.0	96.3	60.7	34.4	21.9
18	108	17	100	103	132.9	572	326	168	134.1	137.3	90.3	65.3	29.9	11.1
19	109	18	107	110	138.3*	584	336	182	139.5*	158.3	106.5	69.0	31.1	12.0
20	110	19	115	121	136.7	573	326	177	138.1	154.0	104.3	63.4	29.3	12.3
21	111	20	112	118	137.0*	567	321	173	138.4*	148.7	102.4	64.1	32.1	11.1
22	112	21	109	123	144.8	578	332	178	146.4	154.6	102.6	64.5	33.2	12.0
23	113	22	105	116	161.1	596	349	197	162.9	174.5	110.6	63.8	28.3	13.4
24	114	23	102	121	157.9	574	357	197	159.8	165.0	93.0	53.0	31.6	10.0
25	115	24	139	128	157.2*	580	355	208	159.1*	177.2	104.9	63.2	35.5	12.2
26	116	25	115	111	164.6	589	359	207	166.7	173.8	100.5	64.9	33.8	9.1
27	117	26	90	100	170.4	587	372	211	172.8	185.7	108.4	67.0	34.9	12.1
28	118	27	75	82	174.2*	638	424	252	176.6*	215.5	130.2	98.7	42.9	20.8
29	119	28	72	69	182.5	594	387	236	185.2	195.7	118.8	58.2	36.5	12.9
30	120	29	70	73	179.4*	622	414	254	182.1*	220.0	125.9	72.5	40.0	29.4
MEAN			94.7	97.5	149.4	582	344	190	150.5	162.9	106.3	67.0	33.3	15.2

* Adjusted for burst.

Note: Data gaps in AFGL Sagamore Hill are due to equipment problems.



OBSERVED AND PREDICTED SUNSPOT NUMBERS

SMOOTHED OBSERVED AND PREDICTED SUNSPOT NUMBERS
CYCLE 21

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1976	15.2	13.2	12.2	12.6	12.5	12.2	12.9	14.0	14.3	13.4	13.5	14.8
1977	16.7	18.1	20.0	22.2	24.2	26.3	28.8	33.0	38.5	44.0	48.8	53.5
											(3)	(6)
1978	58.9	64.8	70.6	76.5	83.1	89.0	93.5	97.5	101.2	104.9	109.7	116.3
	(9)	(11)	(13)	(16)	(19)	(22)	(26)	(29)	(32)	(34)	(33)	(32)
1979	121.8	126.3	130.5	133.6	136.3	140.6	145.0	148.0	149.5	150.0	149.7	148.5
	(32)	(32)	(35)	(36)	(38)	(41)	(43)	(44)	(47)	(49)	(52)	(53)
1980	146.7	145.0	144.3	144.5	143.6	140.3	136.8	133.9	132.3	131.6	130.0	128.6
	(54)	(53)	(52)	(52)	(53)	(53)	(54)	(54)	(53)	(53)	(54)	(56)
1981	128.4	127.7	125.2	122.1	119.9	118.1	117.6	118.1	117.7	116.5	114.6	111.6
	(58)	(58)	(57)	(55)	(54)	(53)	(51)	(49)	(48)	(48)	(46)	(43)
1982	108.2	105.0	102.5	100.8	98.6	95.6	91.4	86.8	82.8	78.4	75.4	71.9
	(41)	(40)	(40)	(38)	(36)	(35)	(33)	(31)	(29)	(25)	(24)	(23)
1983	68.1	65.5	63.7	61.8	59.8	57.7	55.9	54.2	52.6	51.3	50.3	49.7
	(22)	(22)	(23)	(23)	(23)	(23)	(24)	(26)	(27)	(29)	(31)	(31)
1984	48.6	46.7	44.0	40.7	38.1	36.9	35.7	33.9	32.4	31.6	30.5	29.0
	(31)	(30)	(29)	(29)	(30)	(31)	(32)	(31)	(31)	(29)	(28)	(27)
1985	28.0	27.1	26.2	25.7	24.9	23.9	23.2	22.4	21.7	20.9	20.0	19.4
	(27)	(26)	(26)	(26)	(26)	(25)	(23)	(22)	(22)	(23)	(24)	(24)
1986	19.3	19.0	18.5	17.6	16.6	15.6	14.8	14.2	13.9	13.5	13.2	13.0
	(24)	(24)	(24)	(23)	(22)	(20)	(19)	(18)	(17)	(16)	(15)	(13)
1987	13.1	13.4	14.1	15.0	16.0							
	(11)	(11)	(11)	(11)	(12)							

The table gives observed Zürich smoothed sunspot numbers for Cycle 21 up to the one calculated from the latest observed data, marked by a vertical bar. They are based on final Zürich numbers through 1977 and provisional Zürich numbers thereafter. Some of these data after the June 1976 value will change slightly when final data for 1978 are received. The numbers after the vertical bar are predictions by the McNish-Lincoln method (see *Explanation of Data Reports*, February 1978). Shown in parentheses are the corresponding absolute values of the 90% confidence interval, an indication of the uncertainty above and below the predicted number.

The McNish-Lincoln method is very sensitive to the identification of a minimum epoch. In SGD 390-401 issues, the Cycle 21 predictions were based on March 1976 as the minimum epoch. Latest studies, including one published by Waldmeier, show that June 1976 is the more appropriate epoch of minimum. Thus, we have adopted a June 1976 mimimum.

*Prediction of Sunspot Maximum -- The McNish-Lincoln prediction method is recommended for predictions up to only one year ahead. From that point, the predictions regress rapidly towards the mean value. Combining this McNish-Lincoln prediction of sunspot maximum with the Ohl method (as done by Sargent, see *Explanation of Data Reports*, February 1978) indicates that the most probable value for sunspot maximum is 152 ± 38.

Hα SOLAR FLARES

APRIL 1978

OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION — MIN.	IM-POR-TANCE	OBS.		MEASUREMENTS			REMARKS
	DATE APR	START	MAX. PHASE	END	APPROX. LAT.	APPROX. LONG. DIST.	CENTRAL DISTANCE	MCMATH PLAGE REGION	CMP DAY			CORD.	TYPE	TIME — UT	MEAS. AREA Millionths of Disk	CORR. AREA Sq. Deg.	
MANI	02	0307E	0307U	0311D	N12	E06	.326		2.6	4D	SF	3	V		20	.2	
MANI	02	0317E	0317U	0320	N21	E71	.964	15221	7.5	3D	1N	3	P		90	2.3	
MITK	04	0000	0006	0019	S20	W90	.999		28.3	19	SB		C	0006	50		G
MITK	04	0047	0059	0113	S20	W90	.999		28.3	26	SF		C	0059	60		G
MANI	04	0512	0515	0526	N19	E41	.739		7.3	14	SF	3	P		40	.6	
MITK	05	0146	0148	0156	N19	E30	.628		7.3	10	SF		C	0148	70	.9	
MITK	05	0339	0350	0414	N20	E31	.646		7.5	35	SF		C	0350	80	1.1	E
MANI	05	0615	0618	0622	N20	E30	.636		7.5	7	SF	3	P		100	1.3	
MANI	05	0619	0621	0635	N12	W36	.669		2.4	16	SF	3	P		80	1.1	
MANI	05	0628	0630	0640	N22	E29	.644		7.4	12	SF	3	P		40	.5	F
MANI	05	0750	0754	0807D	N21	E27	.616		7.4	17D	SF	2	P		100	1.3	FE
MCMA	05	1310	1313	1345	N17	E20	.508	15221	7.0	35	SN		C	1313	25	.3	D
MCMA	05	1353	1354	1408	N20	E22	.560	15221	7.2	15	SN		C	1354	40	.5	E
MCMA	05	1434	1438	1445	N18	E78	.987	15231	11.5	11	SN		C	1438			D
MCMA	05	1537	1540	1543	N21	E23	.580	15221	7.4	6	SF		C	1540	40	.5	E
MANI	05	2226E	2226U	2235D	N21	E19	.545		7.4	9D	SF	2	V		40	.5	F
MANI	06	0510	0515	0523	N18	E17	.494		7.5	13	SF	3	P		30	.3	
MANI	06	0536	0537	0542	N18	E17	.494		7.5	6	SF	3	P		50	.6	
MANI	06	0541	0546	0556	N11	W50	.795		2.5	15	SF	3	P		110	1.8	
MITK	06	2320	2323	2334	N23	E04	.494		7.3	14	SF		C	2323	130	1.5	
MITK	06	2346	2352	2406	N18	E08	.432		7.6	20	SN		C	2352	160	1.8	E
MITK	06	2356	2359	2404	N18	E09	.437		7.7	8	SF		C	2359	80	.9	
MANI	07	0528	0530	0535	N22	E01	.476		7.3	7	SF	3	P		20	.2	
MITK	07	0707	0711	0715	N17	E05	.406		7.7	8	SF		C	0711	70	.8	
MCMA	07	1140	1144	1148	N20	W01	.445	15221	7.4	8	SN		C	1144	75	.8	E
MCMA	07	1158E		1220D	N17	W05	.406	15221	7.1	22D	SN		C	1208	100	1.0	EL
MCMA	07	1305	1306	1315	N34	W22	.713	15220	5.9	10	SF		C	1306	25	.4	D
MCMA	07	1346	1350	1352	N22	W50	.835	15214	3.8	6	SF		C	1350	20	.4	DH
MCMA	07	1435E	1437	1500	N18	W02	.415	15221	7.5	25D	SN		C	1437	30	.3	EHK
MCMA	07	1435E	1445	1500	N18	W02	.415	15221	7.5	25D	SN		C	1445	40	.4	
MCMA	07	1547	1554	1605	N18	W03	.416	15221	7.4	18	SN		C	1554	70	.8	E
MCMA	07	1618	1625	1630	N19	W06	.440	15221	7.2	12	SB		C	1625	40	.5	EL
MCMA	07	1700	1702	1715	N18	W02	.415	15221	7.6	15	SN		C	1702	30	.3	EL
MCMA	07	1729	1730	1740	N20	W04	.449	15221	7.4	11	SN		C	1730	30	.3	E
MCMA	07	1738	1740	1746	N20	W52	.844	15214	3.8	8	SN		C	1740	30	.5	E
MCMA	07	1840	1842	1847	N20	W04	.449	15221	7.5	7	SF		C	1842	30	.3	E
MCMA	07	1917	1920	1942	N20	W05	.452	15221	7.4	25	SB		C	1920	100	1.1	EK
MCMA	07	1917	1932	1942	N20	W05	.452	15221	7.4	25	SB		C				
MITK	08	0053	0100	0120	S27	E16	.431		9.2	27	SF		C	0100	130	1.5	
MANI	08	0103E	0103U	0115D	S27	E25	.521		9.9	12D	SF	3	V		40	.4	
MITK	08	0120	0235	0418	N20	W12	.485	15221	7.2	178	3B		C	0235	1160	13.6	FHJKUZ
MANI	08	0150E	0156	0239D	N18	W10	.444	15221	7.3	49D	1B	3	P		350	4.0	FU
MANI	08	0150E	0150U	0203	N19	W04	.435		7.8	13D	SN	3	P		120	1.3	
MITK	08	0423	0429	0446	N17	W08	.419		7.6	23	SN		C	0429	160	1.8	EH
MCMA	08	1824	1825	1829	S28	E02	.368	15227	8.9	5	SF		C	1825	25	.3	DH
MCMA	08	1826	1827	1835	N22	W20	.567	15221	7.3	9	SN		C	1827	30	.4	E
MCMA	08	1856	1903	1912	N22	W63	.927	15214	4.1	16	SN		C	1903	40	1.2	E
MCMA	08	1906	1907	1911	N18	E85	.999	15235	15.2	5	SN		C	1907			D
MITK	08	2325	2328	2356	N12	E16	.413		10.2	31	SF		C	2328	60	.7	E
MITK	08	2342	2343	2348	N22	W23	.592		7.3	6	SF		C	2343	60	.8	
MANI	09	0215E	0216	0222D	N22	W70	.962	15221	3.8	7D	1N	3	P		100	2.4	
MITK	09	0316	0318	0330	N16	W20	.500	15221	7.6	14	1N		C	0318	180	2.1	H
MANI	09	0317E	0319	0319D	N15	W19	.479	15214	7.7	2D	1B	3	V		180	2.1	
MITK	09	0422	0425	0437	N23	W72	.971	15214	3.8	15	1N		C	0425	130		
MANI	09	0755E	0756	0800D	N24	W70	.964	15221	4.1	5D	1N	3	V		150	3.6	
WEND	09	1225		1235	N17	W25	.561		7.6	10	SN						
WEND	09	1321		1333	N21	W28	.628		7.5	12	SN						
MITK	10	0247	0252	0352	N17	E17	.484		11.4	65	SF		C	0252	150	1.8	
MITK	10	0449	0449	0509	N18	W34	.664		7.7	20	SB		C	0449	100	1.4	E
MCMA	10	1335	1339	1344	N18	W38	.705	15221	7.7	9	SN		C	1339	20	.3	E
MCMA	10	1405	1407	1412	N15	W17	.460	15229	9.3	7	SN		C	1407	35	.4	E
MCMA	10	1706	1718	1735	N19	E80	.992	15235	16.7	29	SB		C	1718	25		D
MCMA	10	1717	1719	1726	N18	W42	.745	15221	7.6	9	SN		C	1719	20	.4	E
MANI	10	2230E	2232	2236	S25	W24	.491		9.1	6D	SF	3	V		40	.4	F
MANI	10	2304	2306	2316	S25	W24	.491		9.2	12	SF	3	V		50	.6	F

Hα SOLAR FLARES

APRIL 1978

OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IM-POR-TANCE	OBS.		MEASUREMENTS			REMARKS
	DATE APR	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	MCMATH PLAGE REGION	CMP DAY	MIN.		COND.	TYPE	TIME — UT	MEAS. AREA Mill. of Dis	CORR. AREA Sq. Deg.	
MANI	11	0053	0057	0108	N15	E50	.810		14.8	15	SN	3	P		80	1.3	F
MANI	11	0226	0230	0235D	N20	W53	.853		7.1	9D	SN	3	P		100	1.8	
MANI	11	0300	0304	0327	N20	W54	.861		7.1	27	SN	3	P		100	1.8	
MANI	11	0410	0415	0425	N19	W54	.858	15221	7.1	15	1N	3	P		200	3.7	
MANI	11	0522	0529	0625	N15	W23	.521		9.5	63	SF	3	P		100	1.2	F
MANI	11	0538	0541	0555	N23	W48	.824		7.6	17	SF	3	P		80	1.4	F
MCMA	11	1647E		1706D	N21	W56	.879	15221	7.5	19D	SN		P	1647	35	.7	BD
MCMA	11	1655E		1655D	S27	W38	.662	15227	8.9		SN		P	1655	30	.4	D
MCMA	11	1807E		1811D	S27	W38	.662	15227	8.9	4D	SF		P	1807	40	.5	E
MCMA	11	2106E		2117	N17	E56	.868	15235	16.1	11D	SN		C	2106	25	.5	E
MCMA	11	2120	2121	2130	N17	E56	.868	15235	16.1	10	SB		C	2121	40	.8	EH
MCMA	11	2120	2127	2132	S27	W39	.672	15227	9.0	12	SN		C	2127	30	.4	EH
MCMA	11	2120	2127	2150D	N14	E37	.671	15235	14.7	30D	SN		C	2127	40	.5	EH
MANI	12	0454	0456	0502D	N16	E30	.607		14.5	8D	SB	3	V		100	1.3	E
MANI	12	0547	0548	0550D	N27	W40	.781		9.2	3D	SF	3	V		80	1.1	
BUCA	12	0644E	0651	0724D	N20	W63	.923	15221	7.6	40D	2N		C	0651	322	8.5	F
MANI	12	0648E	0650	0655D	N22	W65	.938	15221	7.4	7D	1B	3	V		200	4.4	FU
MANI	12	0740	0741	0746D	N19	E50	.825		16.1	6D	SF	3	V		100	1.7	
MONT	12	0909	0916	0933	N17	E49	.808		16.1	24	SN		C	0916	60		E
ISTA	12	0915E		0926	N16	E51	.822		16.2	11D	SN						E
MONT	12	0909	0932	0950	S43	E76	.967		18.1	41	SN		C	0932	50		
MCMA	12	1310	1311	1324	N20	E58	.891	15235	16.9	14	SN		C	1311	50	1.1	E
MCMA	12	1646	1646	1700	N20	E57	.883	15235	17.0	14	SN		C	1646	30	.6	E
MCMA	12	1736	1739	1800	N20	E45	.784	15235	16.1	24	SB		C	1739	50	.8	E
PALE	12	1737	1739	1759	N18	E46	.784	15241	16.2	22	1B	3	C		168		FDE
MCMA	12	1800E		1825	N23	W73	.975	15221	7.3	25D	SF		C	1815	30		D
PALE	12	1814	1817	1822	N24	W71	.969		7.4	8	SN	3	C		51		F
MCMA	12	1903	1904	1920	N15	E26	.555	15235	14.7	17	SN		C	1904	15	.2	D
MCMA	12	1932	1934	1943	N13	W39	.688	15229	9.9	11	SN		C	1934	30	.4	E
MCMA	12	1934	1936	1940	N17	W75	.977	15221	7.2	6	SF		C	1936			E
MCMA	12	1938	1941	1950	N18	E54	.855	15235	16.9	12	SB		C	1941	30	.6	E
RAMY	12	1938	1941	1949	N17	E53	.843		16.8	11	SB	3	C		31		F
MCMA	12	1947	1955	2010	N16	E44	.756	15235	16.1	23	SN		C	1955	25	.4	E
RAMY	12	1953	2000	2009	N17	E44	.761		16.1	16	SB	3	C		28		F
MCMA	12	1949	2008	2010D	N15	E25	.544	15235	14.7	21D	SF		C	2008	20	.3	D
MANI	13	0450	0455	0512	N20	W88	1.000	15235	6.6	22	1B	3	P		100	3.2	
MANI	13	0706	0709	0722	N15	E20	.491		14.8	16	SF	3	P		60	.7	
RAMY	13	1636	1638	1649D	N17	W90	1.001		6.9	13D	SB	3	C		0		
MITK	13	2224E		2231	S28	W28	.559		11.8	7D	SN		P	2224	80	1.0	D
MANI	13	2232E	2233U	2235D	S28	W25	.527		12.1	3D	SF	2	V		30	.3	
MANI	14	0020E	0024	0045D	N17	E28	.595		16.1	25D	SN	3	P		150	1.9	FU
MITK	14	0020	0025	0112	N19	E28	.612	15235	16.1	52	1N		C	0025	240	3.1	F
MITK	14	0436	0438	0444	S29	W31	.598		11.9	8	SN		C	0438	50	.6	D
MANI	14	0846	0847	0853	N14	E06	.368		14.8	7	SF	3	V		80	.8	
TEHR	14	1059	1102	1112	N15	E 7	.388		15.0	13	SN	2	C		95		
MCMA	14	1229	1232	1250	N15	E03	.374	15235	14.7	21	SF		C	1232	60	.7	E
RAMY	14	1229	1232	1306D	N14	E 1	.355		14.6	37D	SB	3	C		98		U F
RAMY	14	1229	1248	1306D	N14	E 1	.355		14.6	37D	SN	3	C		59		U F
TEHR	14	1232E	1233	1240	N14	E 6	.368		15.0	8D	SN	2	C		127		
MCMA	14	1634	1637	1650D	N15	E02	.373	15235	14.8	16D	SF		C	1637	50	.6	E
RAMY	14	1634	1635	1643	N14	E 2	.356		14.8	9	SN	3	C		26		
MCMA	14	1722	1729	1735	N12	E90	1.000	15244	21.5	13	SF		C	1729			
MCMA	14	1803E		1835D	S25	E34	.605	15237	17.3	32D	SN		C	1815	60	.7	E
RAMY	14	1806E	1808	1829	S25	E32	.582		17.2	23D	SF	3	C		51		F
MITK	15	0246	0249	0254	N22	E23	.596		16.8	8	SN		C	0249	50	.6	
MITK	15	0545	0548	0558	N13	W07	.358		14.7	13	SN		C	0548	80	.9	E
BUCA	15	0631E		0710	N14	W08	.379		14.7	39D	SN		C	0638	150	1.7	E
MITK	15	0632	0636	0659	N14	W08	.379		14.7	27	SN		C	0636	80	.9	E
MANI	15	0635	0637	0700	N14	W08	.379		14.7	25	SB	3	P		90	1.0	E
TEHR	15	0758E	0800	0825	S43	E35	.737		18.0	27D	SN	2	C		64		
TEHR	15	0814	0819	0834	N14	W 5	.365		15.0	20	SB	2	C		190		U F
TEHR	15	0814	0819	0830D	N14	W 5	.365		15.0	16D	SB	2	V		190		U F
MANI	15	0815	0816	0820	N14	W10	.392		14.6	5	SB	3	V		100	1.1	
RAMY	15	1058E	1106	1117	N18	E 5	.427		15.8	19D	SN	3	C		59		F
RAMY	15	1120	1121	1145	N16	E 9	.415		16.1	25	SB	3	C		28		F
RAMY	15	1146	1148	1202	N14	W10	.392		14.7	16	SB	3	C		98		F
RAMY	15	1146	1152	1202	N14	W10	.392		14.7	16	SN	3	C		56		F
MCMA	15	1222	1229	1320	N18	E09	.444	15235	16.2	58	1N		C	1229	175	2.0	EH

Hα SOLAR FLARES

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OBSERV-ATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS'			REMARKS
	DATE APR	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP DAY	MIN.		CORD.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.	
RAMY	15	1223	1225	1233D	N18	E 9	.444	15235	16.2	10D	1B	3	V		278		U F
RAMY	15	1223	1225	1258	N18	E 9	.444	15235	16.2	35	1B	3	C		278		U F
TEHR	15	1229E	1232	1246	N17	E 7	.420	15244	16.0	17D	1B	2	C		318		U F
RAMY	15	1449	1451	1500	N14	W12	.407		14.7	11	SB	3	C		54		F
RAMY	15	1617	1620	1628	N13	W12	.393		14.8	11	SB	3	C		75		F
RAMY	15	1715	1719	1730D	N16	W28	.586		13.6	15D	SB	3	C		84		
RAMY	15	1725	1726	1730D	N17	E70	.957		21.0	5D	SF	3	C		0		
MCMA	15	1824E		1832D	N17	E70	.957	15244	21.0	8D	SF		C	1832	30	.9	D
MANI	16	0352	0354	0402	N14	W19	.471		14.7	10	SN	3	P		30	.3	
MITK	16	0645	0646	0652	N20	E67	.946		21.3	7	SN		C	0646	50		
MANI	16	0919	0921	0923D	N14	W20	.482		14.9	4D	SB	3	P		120	1.4	
MCMA	16	1153E		1208D	N14	W25	.536	15235	14.6	15D	SN		C	1155	50	.6	E
RAMY	16	1451	1452	1503	N18	W62	.914		12.0	12	SF	3	C		20		
MANI	17	0303	0304	0308	N12	W35	.638		14.5	5	SF	3	P		20	.2	
MANI	17	0609	0610	0624	N14	W37	.672		14.5	15	SF	3	P		30	.4	
MCMA	17	1425E		1430	N17	E46	.781	15244	21.1	5D	SF		C	1425	30	.5	DH
MCMA	17	1627	1631	1637	S44	E06	.608	15238	18.1	10	SF		C	1631	25	.3	DH
MCMA	17	1905		2030D	S45	E12	.636	15238	18.7	85D	SF		C	1945	45	.6	E
MCMA	17	2051	2054	2057	N12	W41	.706	15235	14.8	6	SF		C	2054	20	.3	D
MANI	18	0109	0114	0136	N14	W46	.768	15235	14.6	27	1B	3	P		300	4.7	FE
MANI	18	0505	0509	0531	S29	E45	.740		21.6	26	SF	3	P		30	.4	
RAMY	18	1638E	1640U	1655D	S30	E39	.685		21.6	17D	SB	3	C		42		F
MITK	19	0434	0441	0502	N17	W42	.742		16.0	28	SN		C	0441	70	1.0	E
BUCA	19	0654		0800	N21	E45	.791		22.7	66	SN		C	0708	128	2.1	E
MITK	19	0702E	0705	0723	N21	E48	.817		22.9	21D	SN		C	0705	60	1.0	D
MANI	19	0718E	0718U	0726	N21	E50	.834		23.1	8D	SN	3	P		40	.7	
MITK	19	0741	0745	0748	N21	E48	.817		22.9	7	SN		C	0745	60	1.0	E
RAMY	19	1106	1110	1120	N20	E44	.777		22.8	14	SN	3	C		38		
RAMY	19	1201	1228	1247	N21	E43	.773		22.7	46	SB	3	C		126		
RAMY	19	1352	1404	1410	N16	E44	.757		22.9	18	SN	3	C		41		
RAMY	19	1411	1411	1417	N16	E44	.757		22.9	6	SB	3	C		24		
RAMY	19	1453	1500	1515	N18	W48	.804		16.0	22	SB	3	C		95		
RAMY	19	1554	1600	1608	N16	E43	.747		22.9	14	SB	3	C		36		F
RAMY	19	1557	1559	1621	N29	E16	.631		20.9	24	SB	3	C		41		F
RAMY	19	1633	1637	1656	S31	E25	.552		21.6	23	SB	3	C		182		F
RAMY	19	1633	1637	1656	S31	E25	.552		21.6	23	SB	3	C		182		F
RAMY	19	1633	1640	1642	N16	E42	.737		22.8	9	SN	3	C		26		F
RAMY	19	1739	1743	1758	N23	E27	.642		21.8	19	SN	3	C		52		FDE
RAMY	19	1740	1743	1810	N22	E35	.706		22.4	30	SB	3	C		51		F
MCMA	19	1748E		1804D	N24	E35	.721	15248	22.4	16D	SN		C	1754	100	1.4	
MITK	20	0459	0501	0505	N28	E42	.804		23.4	6	SN		C	0501	50	.7	D
BUCA	21	0805E		0825D	N24	W55	.883		17.2	20D	SN		P	0815	32	.7	D
MCMA	21	1900	1905	1920	N18	W63	.921	15254	17.1	20	SN		C	1905	40	.9	E
MCMA	21	2021		2042	N23	E17	.564	15248	23.1	21	SF		C	2030	25	.3	D
MCMA	21	2100	2110	2125	N21	W62	.920	15254	17.2	25	SN		C	2110	20	.5	H
MCMA	21	2231E		2234D	N21	E14	.518	15248	23.0	3D	SN		C	2234	40	.4	D
MITK	22	0322	0323	0332	N17	E08	.428		22.7	10	SN		C	0323	100	1.1	E
MANI	22	0328E	0328U	0335	N17	E09	.433		22.8	7D	SF	3	P		30	.3	
MANI	22	0618	0620	0625	N18	W79	.990		16.3	7	SN	3	P		50	1.3	F
MANI	22	0649	0651	0702D	N21	W67	.948		17.3	13D	SF	3	V		20	.4	
MONT	22	1004	1015	1021	N19	W79	.990		16.5	17	SN		C	1015	50		E
MONT	22	1021	1029	1042	N16	E05	.400		22.8	21	SN		C	1029	70		
MCMA	22	1230	1239	1250	N18	W24	.566	15255	20.7	20	SN		C	1239	60	.7	E
MCMA	22	1300	1308	1320	N18	W24	.566	15255	20.7	20	SN		C	1308	70	.8	E
MCMA	22	1410	1412	1415	N17	W90	1.001	15235	15.8	5	SN		C	1412			
MCMA	22	1420	1430	1442	N23	E24	.618	15250	24.4	22	SF		C	1430	35	.5	E
MCMA	22	1505	1515	1530	N18	W24	.566	15255	20.8	25	SN		C	1515	75	.8	E
MCMA	22	1817	1821	1832	N23	E23	.609	15250	24.5	15	SN		C	1821	30	.4	E
MCMA	22	1859	1904	1922	S33	W01	.438	15246	22.7	23	SF		C	1904	20	.3	E
MCMA	22	1923	1924	1930	N22	W04	.490	15248	22.5	7	SB		C	1924	30	.3	D
MCMA	22	1946	1948	1950	N11	W09	.345		22.1	4	SF		C	1948	20	.2	D
MCMA	22	1948	1951	1955	N21	W03	.473	15248	22.6	7	SF		C	1951	25	.3	D
MCMA	22	1950	1954	2002	N17	W13	.458	15244	21.9	12	SN		C	1952	30	.3	E
MCMA	22	2016	2028	2055	N19	W26	.596	15255	20.9	39	SN		C	2028	60	.8	E
MCMA	22	2116	2118	2130D	N16	W01	.392	15248	22.8	14D	SN		C	2118	30	.3	E

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OBSERVATORY	OBSERVED UT				LOCATION					DURATION — MIN.	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS
	DATE APR	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	MCMATH PLAGE REGION	CMP DAY			CORD.	TYPE	TIME — UT	MEAS. AREA Millionths of Disk	CORR. AREA Sq. Deg.	
MCMA	22	2138	2141	2145	N22	W04	.490	15248	22.6	7	SF		C	2141	30	.3	E
MITK	23	0139	0146	0152	N24	E17	.577		24.3	13	SF		C	0146	70	.9	OH
WEND	24	0828		0839	S16	W13	.267		23.4	11	SN						
MITK	25	0111E		0113D	S31	W35	.649		22.4	2D	SN		P	0112	100	1.4	H
MITK	25	0220	0222	0237	S31	W37	.669		22.3	.17	SN		C	0222	140	2.0	
MITK	25	0326	0327	0328	N30	E90	1.002		3.9	2	SF		C	0327	50		DGH
MITK	25	0333	0334	0336	S21	W07	.266		24.6	3	SF		C	0334	50	.5	O
MANI	25	0926E	0926U	0934D	S30	W30	.591		23.1	8D	SF	2	V		50	.6	F
MCMA	25	1320	1329	1355	N20	E76	.983	15266	3.3	35	1N		C	1329	60	2.5	E
MCMA	25	1336	1338	1345D	N25	W33	.713	15248	23.1	9D	SF		C	1338	20	.3	E
MCMA	25	1348	1355	1405	N25	W33	.713	15248	23.1	17	SN		C	1355	25	.4	E
MCMA	25	1420	1428	1500	N18	E74	.975	15266	3.1	40	1B		C	1428	80	3.0	
MCMA	25	1535	1545	1655	N18	E74	.975	15266	3.2	80	1B		C	1545	80	3.0	EK
MCMA	25	1811E		1830D	N28	E14	.611	15265	26.8	19D	SN		C	1818	30	.4	E
MCMA	25	2000E		2013D	N18	E72	.967	15266	3.2	13D	SF		C	2004	25	.8	D
MCMA	25	2210	2216	2227	N28	E77	.990	15266	3.7	17	SB		C	2216	20	.7	D
MANI	25	2310E	2310U	2318D	S30	W51	.798		22.1	8D	SF	2	V		30	.5	F
MANI	26	0305	0307	0319	N18	W72	.967		20.7	14	SF	3	P		50	1.1	
MANI	26	0727	0731	0743D	S31	W45	.746		22.9	16D	SN	3	P		70	1.1	
MCMA	26	1339	1350	1500D	N19	E60	.904	15266	3.1	81D	1B		C	1350	100	2.4	FH
MCMA	26	1549E	1610	1640D	N19	E58	.890	15266	3.0	51D	SN		C	1610	80	1.8	E
MCMA	26	1713	1717	1730	S32	W51	.803	15246	22.9	17	SB		C	1717	50	.8	E
MCMA	26	1855	1857	1901	N18	E57	.880	15266	3.1	6	SN		C	1857	40	.8	E
MCMA	26	1920	1925	1938	N20	E56	.878	15266	3.0	18	SF		C	1925	50	1.1	E
MCMA	26	1940	1958	2040	N20	E56	.878	15266	3.0	60	1N		C	1958	150	3.3	F
MCMA	26	2116	2123	2128	N19	E56	.875	15266	3.1	12	SF		C	2123	20	.5	D
MCMA	26	2133	2136	2142	S30	W50	.789	15246	23.1	9	SN		C	2136	25	.5	D
MCMA	26	2203	2209	2228	N18	W85	.999	15255	20.5	25	SN		C	2209			
MCMA	26	2210	2218	2225D	N19	E54	.860	15266	3.0	15D	SN		C	2218	40	.8	D
MANI	27	0128E	0129	0132	S32	W56	.844		22.9	4D	SF	3	P		50	.9	
MANI	27	0707	0710	0718	N20	E52	.847		3.2	11	SF	2	P		30	.5	
MCMA	27	1605	1606	1612	N25	E45	.813	15266	3.0	7	SN		C	1606	40	.7	EL
MCMA	27	1923	1937	2045	N20	E42	.760	15266	3.0	82	SN		C	1937	40	.6	EL
MCMA	27	2046	2048	2105	N20	E42	.760	15266	3.0	19	SN		C	2048	60	1.0	E
MANI	28	0010	0012	0027	N28	E45	.828		3.4	17	SN	3	P		90	1.5	U
ISTA	28	0645		0705	N20	E35	.693		2.9	20	SF						E
MCMA	28	1123	1130	1133	N20	W75	.980	15248	22.8	10	SN		C	1130	30	1.0	O
MCMA	28	1155	1159	1204	N22	E31	.671	15266	2.8	9	SB		C	1159	30	.4	O
MCMA	28	1304	1335	2237D	N23	E35	.715	15266	3.2	573D	3B		C	1335	1600	22.0	FLTUXY
MCMA	28	1500	1504	1511D	N17	W85	.999	15248	22.3	11D	SN		C	1504			E
MCMA	28	1812	1814	1821	N19	E51	.835	15269	4.6	9	SB		C	1814	60	1.1	H
MCMA	28	2152E		2203D	N20	E24	.588	15266	2.7	11D	SF		C	2200	60	.8	E
MANI	29	0411	0412	0415	N22	E25	.617		3.0	4	SF	3	P		30	.3	
MANI	29	0442	0446	0455	N19	E22	.559		2.8	13	SF	3	P		70	.8	F
MANI	29	0554	0557	0605	N19	E21	.550		2.8	11	SF	3	P		40	.4	F
MCMA	29	1455		1510D	N20	E16	.522	15266	2.8	15D	SF		C	1504	40	.5	E
MCMA	29	2010E		2211D	N20	E14	.508	15266	2.9	121D	2B		P	2012	500	6.0	BYZ
MCMA	30	1155	1158	1205	S27	E90	.998	15280	9.2	10	SF		C	1158			CAP
MCMA	30	1218	1223	1300	N20	E04	.462	15266	2.8	42	SB		C	1223	50	.6	EH
MCMA	30	1320	1330	1350D	N28	E11	.599	15266	3.4	30D	SN		C	1330	125	1.6	FL
MCMA	30	1420	1455	1659D	N28	E14	.612	15266	3.6	279D	3B		C	1455	1200	15.0	FLTUX
MCMA	30	1700E		1718D	S27	E90	.998	15280	9.5	18D	SN		P	1718			D
MCMA	30	1827	1833	1840	S27	E90	.998	15280	9.5	13	SF		C	1833			D
MCMA	30	1840	1846	1859D	S28	W61	.875	15252	26.2	19D	SF		C	1846	40	.8	E
MANI	30	2234	2239	2256	N21	E01	.473		3.0	22	SF	3	P		50	.5	F

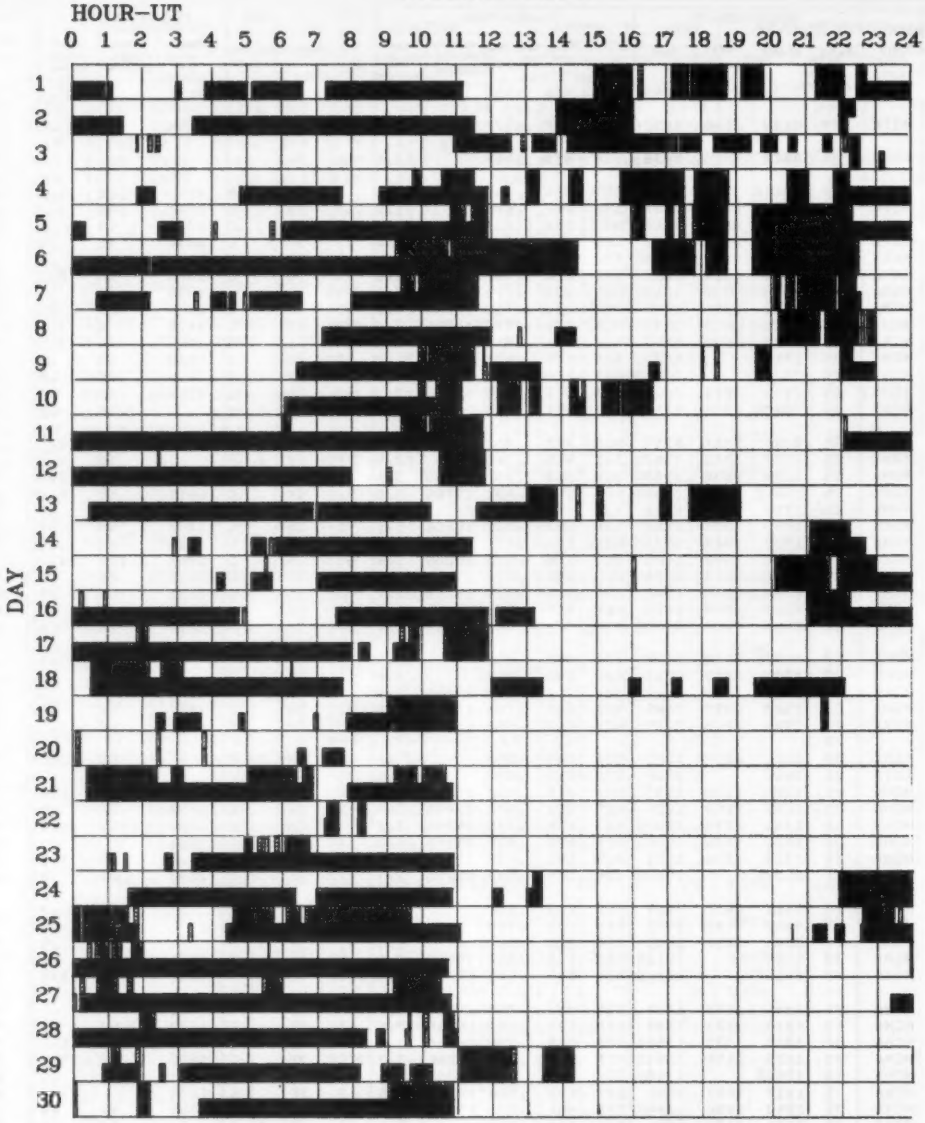
"Remarks":

A = Eruptive prominence whose base is less than 90° from central meridian.
B = Probably the end of a more important flare.
C = Invisible 10 minutes before.
D = Brilliant point.
E = Two or more brilliant points.
F = Several eruptive centers.
G = No visible spots in the neighborhood.
H = Flare accompanied by a high speed dark filament.
I = Active region very extended.
J = Distinct variations of plage intensity before or after the flare.
K = Several intensity maxima.
L = Existing filaments show signs of sudden activity.
M = White-light flare.
N = Continuous spectrum shows effects of polarization.
O = Observations have been made in the calcium II lines H and K.
P = Flare shows helium D_3 in emission.
Q = Flare shows the Balmer continuum in emission.
R = Marked asymmetry in Hα line suggests ejection of high velocity material.
S = Brightness follows disappearance of filament (same position).
T = Region active all day.
U = Two bright branches, parallel (||) or converging (Y).
V = Occurrence of an explosive phase: important and abrupt expansion in about a minute with or without important intensity increase.
W = Great increase in area after time of maximum intensity.
X = Unusually wide Hα line.
Y = System of loop-type prominences.
Z = Major sunspot umbra covered by flare.

INTERVALS OF NO FLARE PATROL OBSERVATION

FOR PRECEDING SOLAR FLARE TABLE

APRIL 1978

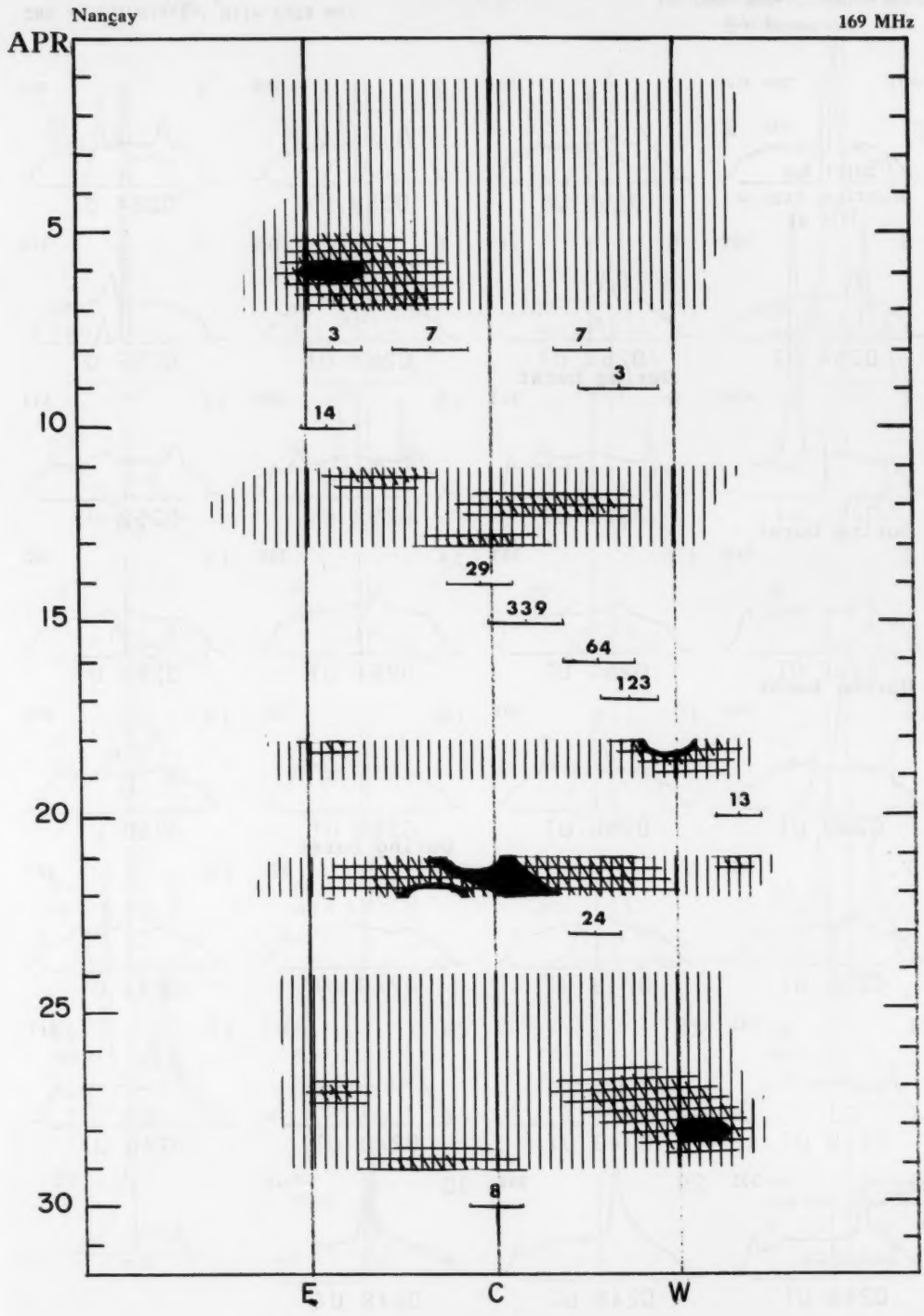


Bucharest	Istanboul	Manila	Monte Mario	Tehran
Herstmonceux	Kandilli	McMath-Hulbert	Palehua	Upice
Holloman	Kodaikanal	Mitaka	Ramey	Wendelstein

Times of no flare patrol are shown by the shaded area for each day divided into times of no cinematographic patrol (bottom half of day) and times of neither visual nor cinematographic patrol (top half of day).

SOLAR RADIO EMISSION
INTERFEROMETRIC OBSERVATION

APRIL 1978



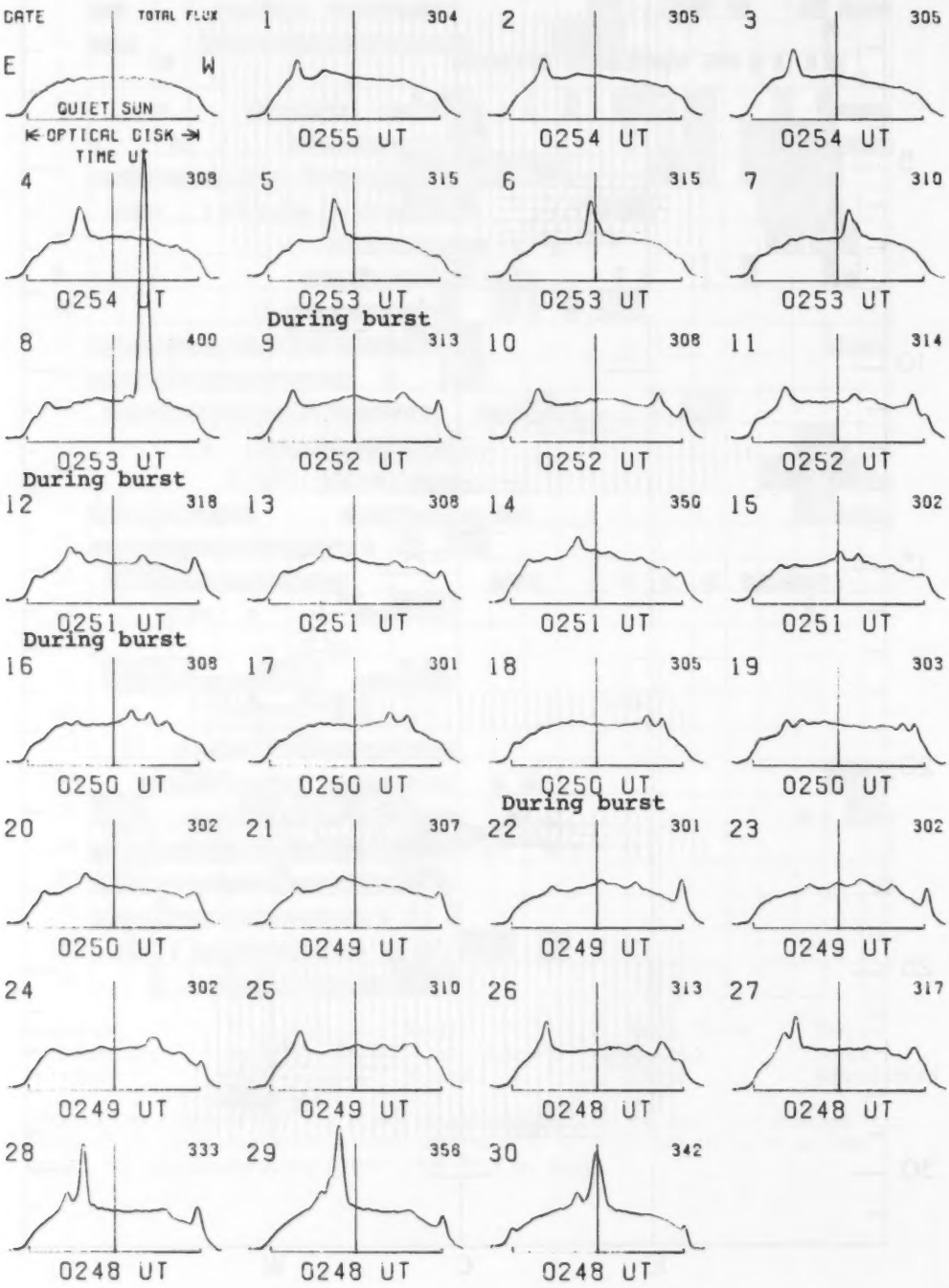
18
Apr 78

EAST-WEST SOLAR SCANS

APRIL 1978

TOYOKAWA, JAPAN

3 CM
FAN BEAM WITH 1.1 MINUTES OF ARC

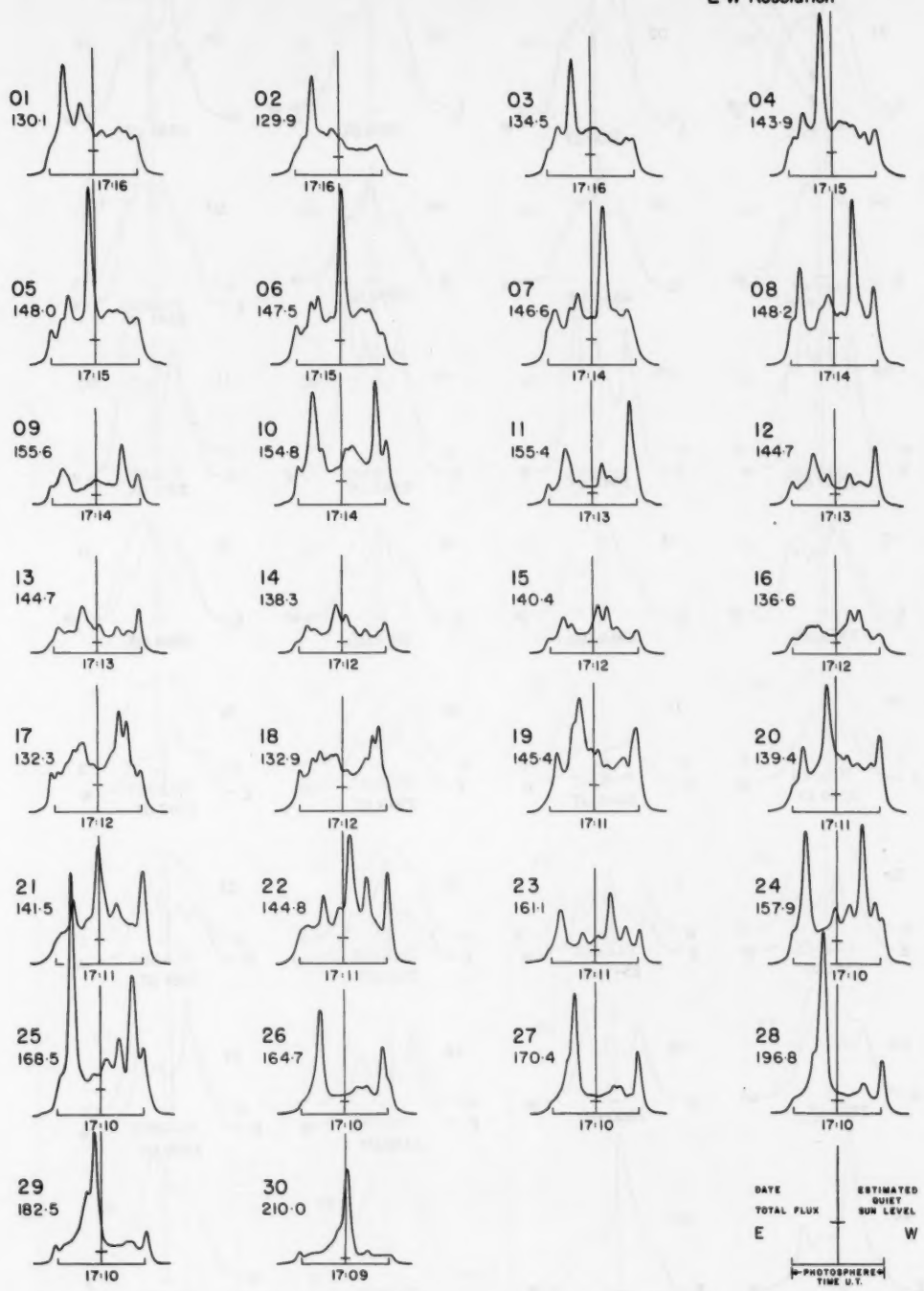


EAST-WEST SOLAR SCANS

APRIL 1978

ALGONQUIN RADIO OBSERVATORY
CANADA

10·7cm
Fan Beam with 1·5 minutes of arc
E-W Resolution

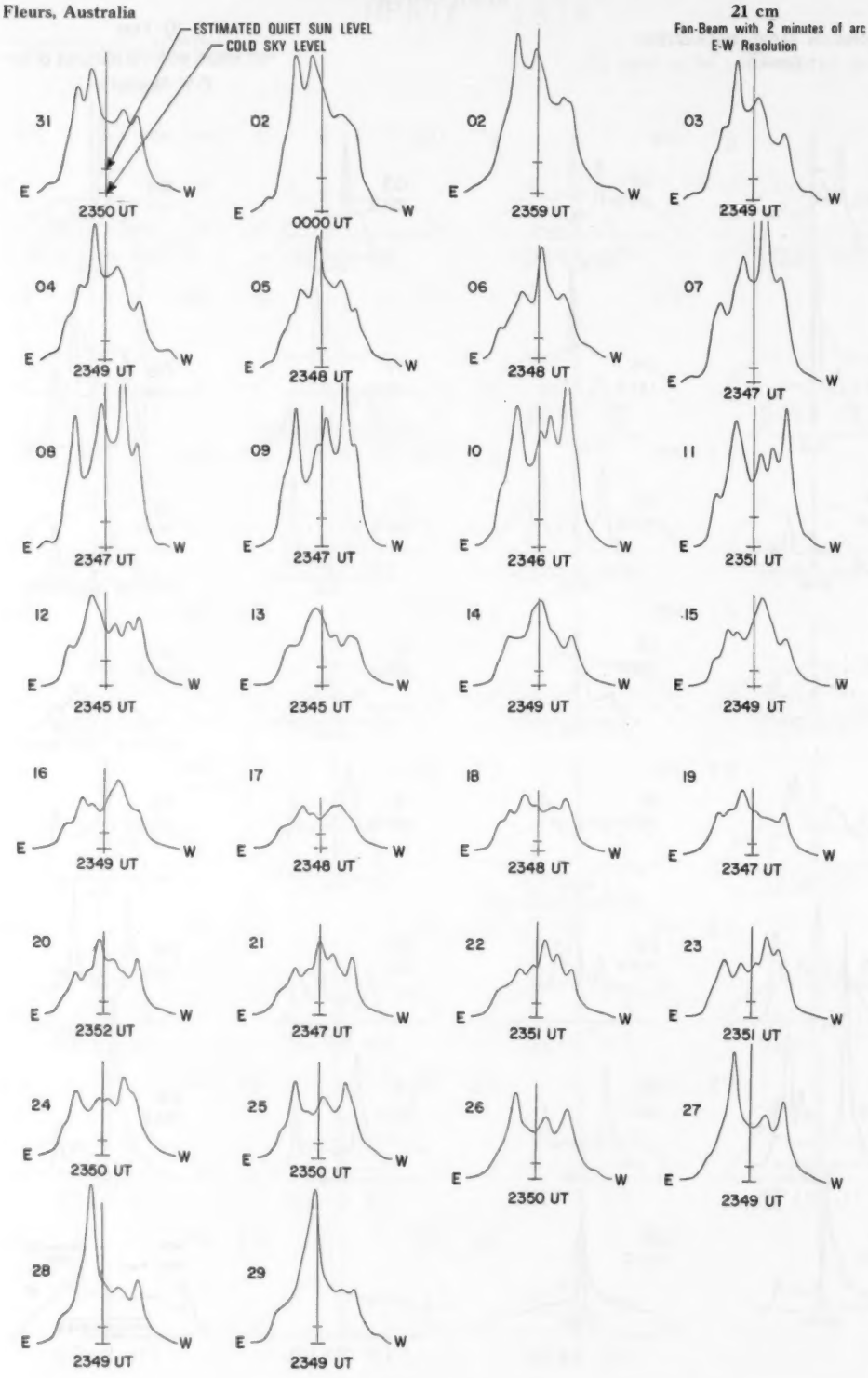


EAST-WEST SOLAR SCANS

APRIL 1978

Fleurs, Australia

21 cm
Fan-Beam with 2 minutes of arc
E-W Resolution

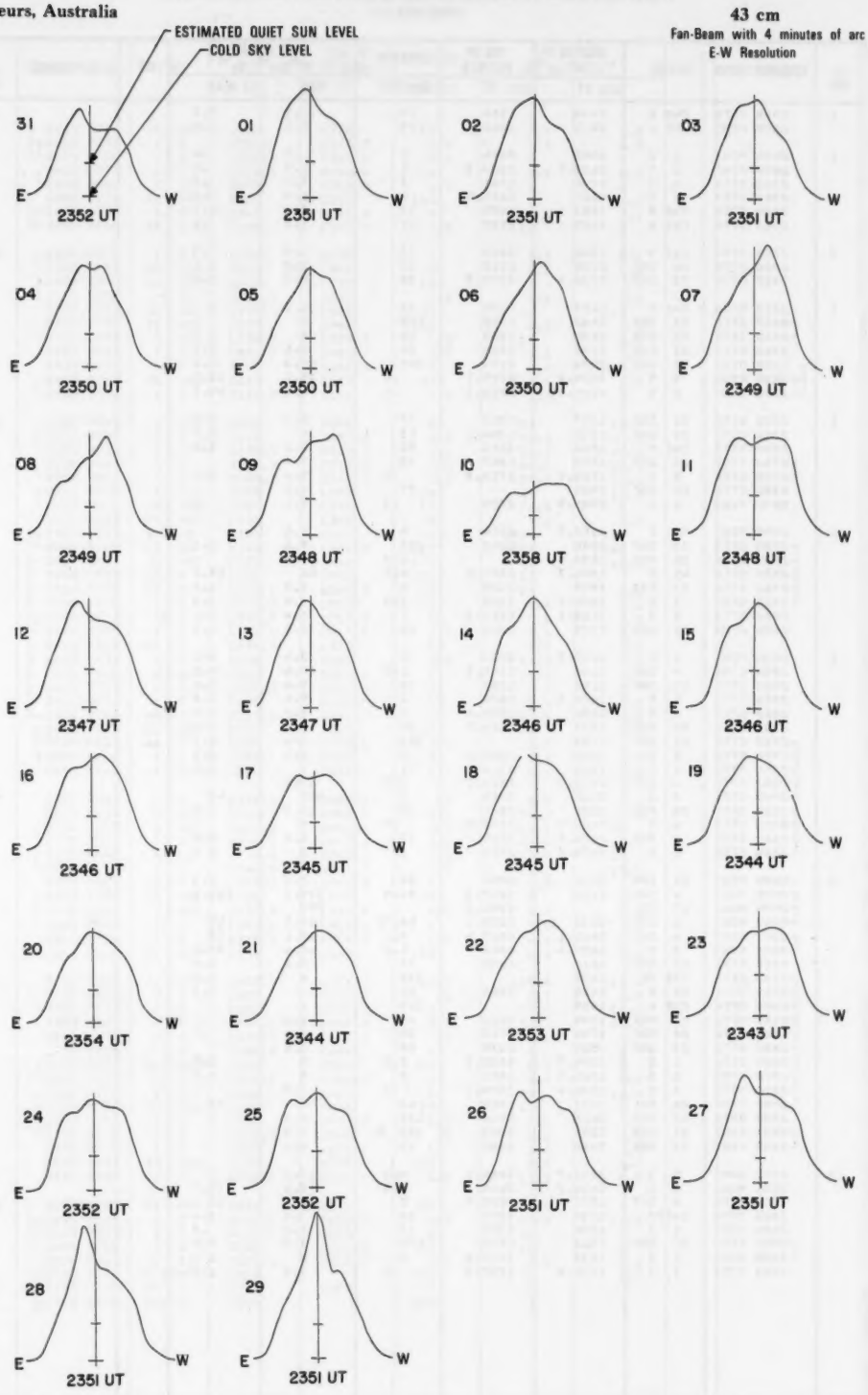


EAST-WEST SOLAR SCANS

APRIL 1978

Fleurs, Australia

43 cm
Fan-Beam with 4 minutes of arc
E-W Resolution



SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS
APRIL 1978

APR 1978	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} MEAN	INT	REMARKS
1	2800	OTTA	240 R	1445	1514	29	2.4	1.2		
	2695	PENT	240 R	2015	2310	175	4.6	1.3		
2	2695	PENT	1 S	0003	0004	2	.8	.4		
	2695	PENT	1 S	0023.5	0023.9	1	1.8	.9		
	2800	OTTA	1 S	1740	1741	2	1.4	.7		
	2800	OTTA	1 S	1823	1823.5	2	1.6	.8		
	2800	OTTA	240 R	1903	1935	32	2.4	1.2		
	2800	OTTA	240 R	2020	2035	15	1.2	.6		
3	2800	OTTA	240 R	1330	1340	10	1.8	.9		
	2300	OTTA	20 GRF	2050	2100	22	2.2	1.1		
	2800	OTTA	20 GRF	2231.5	2233.5	20	5.2	1.8		
4	2800	OTTA	240 R	1420	1430	10	1.8	1		
	2800	OTTA	23 GRF	1442	1550	155	2			
	2800	OTTA	20 GRF	1650	1653	15	2	1		
	2800	OTTA	20 GRF	1755	1830	95	2.4	1.7		
	2800	OTTA	28 GRF	2028	2155	260	16.8	6.2		
	2695	MANI	3 S	2215.4	2215.7	.6	16.7	11.2		
	8800	MANI	3 S	2215.7	2215.8	.3	74.4	49.6		
5	2800	OTTA	20 GRF	1307	1312	38	5.2	1.8		
	2800	OTTA	20 GRF	1350	1354.1	13	5	1.4		
	2800	OTTA	240 R	1500	1520	20	2.2	1.1		
	2800	OTTA	23 GRF	1620	1647	80	2.4			
	2800	OTTA	8 S	1728.5	1728.9	.5	5.4	2.7		
	2800	OTTA	22 GRF	1903		57	1.4			
	2695	PENT	8 S	2308.9	2309	.3	1.4	.7		
6	2695	PENT	40 F	0053.8	0054	4	4.6			
	2800	OTTA	23 GRF	1500	1650	255	5.6	2.8		
	2800	OTTA	28 PRE	1857.5		2.8	3.4			
	2800	OTTA	45 C	1900.3	1901.5	4.7	66	18.2		
	2800	OTTA	30 PBI	1905	1905	6	2.8	1.4		
	2800	OTTA	1 S	1906.5	1908	2.5	6.4	3.2		
	2800	OTTA	1 S	2210.1	2210.3	2	8.4	2.1		
	2695	PENT	20 GRF	2320	2355	65	2.6	1.3		
7	2695	PENT	1 S	0029.5	0030	1	2.4	1.2		
	2800	OTTA	4 S/F	1140	1140.6	1.8	16.6	4.2		
	2800	OTTA	20 GRF	1150	1200	80	5.6	2.8		
	2800	OTTA	1 S	1435.9	1436	2	9.4	2.8		
	2800	OTTA	1 S	1554	1554.2	2	4.2	1.4		
	2800	OTTA	20 GRF	1623	1624.5	25	2.8	1.2		
	2800	OTTA	21 GRF	1740		370	9.4	4.7		
	2800	OTTA	1 S	1841	1841.3	2	8.4	2.8		
	2800	OTTA	1 S	1918	1918.5	1	7	3.5		
	2800	OTTA	4 S/F	1930.5	1931.2	2.5	12.6			
	2800	OTTA	3 S	2015	2016	6	160	40		
	2800	OTTA	29 PBI	2021	2021	19	10.4	3.4		
	2800	OTTA	8 S	2130.5	2130.6	.5	5			
	2800	OTTA	2 S/F	2134.5	2136	10	2.8	1.2		
	2800	OTTA	1 S	2224.5	2225	1	2	1		
8	2695	PENT	20 GRF	0037	0050	30	3.8	1.9		
	2695	MANI	4 S/F	0124	0227.9	81.6	376.7	206.6		
	2695	MANI	47 GB		0240.8		750			
	8800	MANI	4 S/F	0130 E	0228.4	66.7D	160.8	145		NT
	2695	MANI	4 S/F	0805.1	0807.6	4.1	18.1	12		
	8800	MANI	3 S	0805.4	0806	1.2	45.6	30.4		
	2800	OTTA	20 GRF	1218	1234	72	2.8	1.4		
	2800	OTTA	27A RF	1420		330	4	3.5		
	2800	OTTA	24 R	1420	1500	40	4	2.8		
	2800	OTTA	24P R	1500		250	4			
	2800	OTTA	20 GRF	1555	1610	65	1.4	.7		
	2800	OTTA	20 GRF	1705	1715	35	1.4	.7		
	2800	OTTA	23 GRF	1804	1835	65	2.8			
	2800	OTTA	1 S	1804.5	1805.5	2.5	5	2.5		
	2800	OTTA	1 S	1826.5	1827	2	5	1.7		
	2800	OTTA	8 S	1906.4	1906.4	.1	2.8			
	2800	OTTA	26 FAL	1910	1950	40	-4	-2		
	2800	OTTA	22 GRF	2015	2046	110	5.2	3		
	2695	PENT	21 GRF	2255	2350	150 D	7.8			
	2695	PENT	20 GRF	2440	2445	35	2.6			
9	8800	MANI	3 S	0212.7	0214.1	4.2	13.6	9		
	2695	MANI	3 S	0444.2	0448.3	6.5	17.5	11.7		
	2800	OTTA	4 S/F	1201	1202.5	3	30	13		
	2800	OTTA	240FR	1237	1252	15	2.8	1.4		
	2800	OTTA	1 S	1255	1300	10	1.8	.9		
	2800	OTTA	21 GRF	1312	1440	175	8.2	3.8		
	2800	OTTA	1 S	1437	1437.5	1	2	1		
	2800	OTTA	8 S	1732.6	1732.8	.8	3.8	1.2		

SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS
APRIL 1978

APR 1978	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} MEAN	INT	REMARKS
	2800	OTTA	21 GRF	1915	1930	45	2.8	1.2		
	2800	OTTA	1 S	1920.2	1920.7	1.5	3.8	1.9		
	2695	BCUL	1 S	1920.5	1921.5	1.5	5	2		
	2800	OTTA	1 S	2052.5	2053.8	6	5.6	1.9		
	2695	BCUL	2 SF	2054	2054.5	1.5	5	2		
	2800	OTTA	21 GRF	2145	2240	160	7	3.5		
	2800	OTTA	3 S	2147	2150.8	8	12.4	3.2		
	2695	BCUL	45 C	2148	2151.5	6.5	13	4		
10	2800	OTTA	1 S	1133	1137	7	8.2	4.1		
	2900	OTTA	29 PBI	1140	1140	12	2.8	1.4		
	2800	OTTA	21 GRF	1512	1522	25	1.4	.7		
	2800	OTTA	1 S	1517.3	1519	3.8	4.4	2.2		
	2800	OTTA	26 FAL	1550	1620	30	-2	-1		
	2800	OTTA	21 GRF	1625	1842	165	2.8	1.4		
	2800	OTTA	4 S/F	1730.5	1739.3	1.5	28	4.6		
	2800	OTTA	1 S	1951.5	1952	1.5	1.2	.6		
	2800	OTTA	1 S	2101	2101.3	2	8.8	2.2		
	2800	OTTA	21 GRF	2123	2133	37	2.6	1.3		
	2800	OTTA	1 S	2140.5	2141	2.5	3.8	2		
11	2695	PENT	4 S/F	0055	0056	5	58	15.4		
	8800	MANI	3 S	0055	0055.8	3.4	94.8	63.2		
	2695	MANI	4 S/F	0055.3	0055.9	2.2	54.3	36.2		
	2695	MANI	3 S	0536.8	0537.2	3.4	64.4	42.9		
	8800	MANI	3 S	0537.2	0537.3	1.2	24.8	16.6		
	2800	OTTA	4 S/F	1155	1159	10	34	11.2		
	2800	OTTA	29 PBI	1205	1205	17	11.4	5		
	2500	OTTA	28 PRE	1334	1342	8	3.6	1.8		
	2800	OTTA	47 GB	1342	1421	78	2878	582		
	2695	BCUL	49 GB	1343	1421.5	227	4200	1400		
	2800	OTTA	30 PBI	1500	1500	470	57	18.4		
	2800	OTTA	40 F	1504	1548	156	111			
	2800	OTTA	45 C	1848.2	1850.5	12	22	8.8		
	2800	OTTA	1 S	1911.5	1912	1	4.6	2.3		
	2800	OTTA	1A S	1915.5	1917.5	4	3.4	2.3		
	2800	OTTA	1 S	1916.6	1917.4	1	6.4	2.2		
	2800	OTTA	45 C	1937.5	1939	5	5.6	2.8		
	2800	OTTA	3 S	2024	2026	2.5	11.6	5.8		
	2695	PENT	4 S/F	2033	2035.2	5	21.6	7.2		
	2800	OTTA	1 S	2057.3	2057.5	1	2.2	1		
	2800	OTTA	1 S	2105	2105.5	1	3.4	1.1		
	2800	OTTA	45 C	2119.5	2121.5	5	11.4	3.8		
	2695	PENT	21 GRF	2300	2310	65	4	2.4		
	2695	PENT	40 F	2304	2306.1	3.5	7.6			
	2695	PENT	1 S	2321	2322	2	3.8	1.9		
	2695	PENT	2 S/F	2344	2344.1	1	6.4	4.8		
12	2695	MANI	1 S	0455.9	0456.2	.5	6.5	4.2		
	2695	MANI	4 S/F	0506.4	0506.5	1.1	37.3	24.8		I
	8800	MANI	4 S/F	0641.8	0644.1	9.7	61.4	39		
	2695	MANI	4 S/F	0642.6	0647.1	6.4	32.4	19.4		
	8800	MANI	4 S/F	0740.5	0740.9	1.6	139.5	83.7		
	2695	MANI	3 S	0740.5	0740.9	1.3	29.2	19.4		
	2800	OTTA	40 F	1719.5	1719.8	1	4.8			
	2800	OTTA	23 GRF	1735	1804	95	4	2.2		
	2800	OTTA	2 S/F	1735.5	1738.5	4.5	4.8	2.4		
	2800	OTTA	1 S	1903.2	1903.5	1	1.4	.7		
	2800	OTTA	1 S	2219.5	2220.3	2.5	4.4	1.5		
	2695	PENT	22 GRF	2350	2440	100	4.8	2.8		
13	8800	MANI	22 GRF	0447.4	0452.7	19.2	165.6	110.4		IG
	2695	MANI	3 S	0627	0627.2	.4	2.9	1.7		
	8800	MANI	3 S	0627	0627.3	1	27.6	16.6		I
	8800	MANI	3 S	0705.8	0707.7	3.2	52.4	34.9		I
	2800	OTTA	8 S	1141.2	1141.3	.8	3.4	1.2		
	2800	OTTA	1 S	1256.9	1257	1	2	1		
	2800	OTTA	21 GRF	1305	1315	55	6.2	2		
	2800	OTTA	1 S	1311.7	1311.9	2	9.2	4.6		
	2800	OTTA	4 S/F	1438	1441	6	21	10.5		
	2800	OTTA	30 PBI	1444	1444	75	11	5		
	2800	OTTA	1 S	1505	1505.7	1.5	1.4	.7		
	2800	OTTA	8 S	1550.8	1551	.5	1.2	.6		
	2800	OTTA	1 S	1657	1658.2	6	1.8	.9		
	2800	OTTA	20 GRF	1705	1725	55	2.6	1.6		
	8800	MANI	3 S	2335.2	2336.7	4.5	17.5	8.5		
14	2695	PENT	21 GRF	0015	0032	65	3.6	2		
	2695	MANI	3 S	0021.7	0023.7	4.8	17.2	11.5		
	2695	PENT	3 S	0021.7	0024	6	14	7		
	2695	BCUL	3 S	0022	0024.5	5	15	5		
	2695	MANI	4 S/F	0839.4	0840.1	1.4	8.6	5.1		
	2800	OTTA	27AFRF	1200		200	3	2.6		
	2800	OTTA	24 R	1200	1207	7	3			
	2800	OTTA	24P R	1207		153	3			

SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS
APRIL 1978

APR 1978	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} MEAN	INT	REMARKS
	2800	OTTA	1 S	1230	1234.5	7	3	1.6		
	2800	OTTA	26 FAL	1440	1520	40	-3	-1.6		
	2800	OTTA	27AFRF	1600		220	3	2.6		
	2800	OTTA	24 R	1600	1625	25	3	1.5		
	2800	OTTA	24P R	1625		165	3			
	2800	OTTA	2 S/F	1634	1634.3	2	2.4	1		
	2800	OTTA	1 S	1846.5	1848.5	7	7.4	3		
	2695	BCUL	3 S	1846.5	1849	11.5	8	3		
	2800	OTTA	26 FAL	1910	1940	30	-3	-1.5		
	2800	OTTA	1 S	2036.9	2037	2	2.4	1		
	2695	BCUL	1 S	2037	2038	3	3	1		
	2695	BCUL	45 C	2201	2207.6	9	8	3		
	2800	OTTA	1 S	2201.2	2202.1	2	3	1.5		
	2800	OTTA	41 SER	2201.2	2207	6.8	6			
	2800	OTTA	1 S	2205.5	2207	2.5	6	2.5		
	2695	PENT	240AR	2228	2247	19	1.8	.9		
	2695	PENT	4 S/F	2241.2	2243.5	5	19.6	9		
	8800	MANI	4 S/F	2241.3	2242.8	3.5	159.5	95.7		
	2695	MANI	4 S/F	2242.4	2243.6	2.7	14.3	9.5		
15	2695	MANI	4 S/F	0630.7	0636.8	14.1	37.8	25.2		
	2695	MANI	3 S	0748.8	0750	2.3	37.8	25.2		
	2695	MANI	3 S	0812	0812.9	4	25.2	16.8		
	2800	OTTA	45 C	1146	1146.5	6	16.4	5.5		
	2800	OTTA	4 S/F	1220	1228.5	13	30	10		
	2800	OTTA	29 PBI	1233	1233	87	7.4	2.5		
	2800	OTTA	20 GRF	1420	1455	70	2.8	1.4		
	2800	OTTA	21 GRF	1605	1617	35	5	2.5		
	2695	BCUL	46 C	1612.5	1615	8.5	7	2		
	2800	OTTA	1 S	1614	1614.5	2	4.6	2.3		
	2800	OTTA	1 S	1618	1618.7	2	2.8	1.4		
	2800	OTTA	1 S	1623.5	1623.8	1	1.4	.7		
	2800	OTTA	21 GRF	1700	1810	205	8	5		
	2800	OTTA	8 S	1743.6	1743.8	.3	1.4	.7		
	2800	OTTA	21 GRF	2055	2117	125	2.6	1.3		
	2800	OTTA	8 S	2122	2122.1	.9	2.8	1.4		
	2800	OTTA	1 S	2152	2152.2	1	2	1		
	2695	PENT	1 S	2342	2342.5	1.5	5.4	2.7		
	2695	BCUL	1 S	2342	2343	2	6	2		
16	2695	MANI	4 S/F	0918.9	0919.9	6.4	81.4	54.3		
	8800	MANI	4 S/F	0919.1U	0920	5.9U	139.3U	92.9U		I
	2800	OTTA	1 S	1152.5	1153.2	1	1.8	.9		
	2800	OTTA	20 GRF	1200	1207	20	1.8	.9		
17	2800	OTTA	20 GRF	1200		230	3.6	1.8		
	2800	OTTA	21 GRF	1900	2030	240	2.6	1.6		
	2800	OTTA	1 S	1906	1907	3	1.6	.8		
	2695	BCUL	1 S	1906.5	1908	3	1	.3		
18	2695	PENT	4 S/F	0104.5	0111.5	14.5	97	35		
	2695	MANI	3 S	0107.7	0110.5	8.3	103.6	69.1		
	8800	MANI	3 S	0107.7	0110.8	9.5	49.6	32.9		IG
	2695	PENT	29 PBI	0119	0119	20 D	9.6			
	2800	OTTA	21 GRF	1200	1510	250	4.2	2.4		
	2800	OTTA	1 S	1246	1247.5	7	5.4	2		
	2800	OTTA	1 S	1350	1350.7	2	3.2	1.4		
	2800	OTTA	20 GRF	1742	1815	48	1.6	1		
	2800	OTTA	20 GRF	1858	1905	30	2	1.2		
	2800	OTTA	240 R	1950	2040	60	3	1.3		
19	2800	OTTA	23 GRF	1453	1800	765	9.8	4.9		
	2800	OTTA	2 S/F	1536	1536.7	1.5	5.2	2		
	2695	BCUL	1 S	1536.5	1537.5	1.5	6	2		
	2800	OTTA	1 S	1950.5	1951.5	5	2.8	1.1		
	2695	BCUL	1 S	1951	1952.5	3.5	4	1		
20	2695	PENT	1 S	0110.8	0111	1	1.4	.7		
	2800	OTTA	27A RF	1335		150	1.4	1.2		
	2800	OTTA	24 R	1335	1355	20	1.4	.7		
	2800	OTTA	24P R	1355		115	1.4			
	2800	OTTA	1 S	1452.9	1453.5	2	4	1.8		
	2695	BCUL	1 S	1453	1454	3.5	5	2		
	2800	OTTA	20 GRF	1457	1515	40	2.2	1.4		
	2800	OTTA	26 FAL	1550	1605	15	-1.4	-.7		
	2800	OTTA	26 FAL	1615	1627	12	-2.8	-1.8		
	2800	OTTA	21 GRF	1705		255	6.8	4.8		
	2800	OTTA	2 S/F	1725	1725.5	1	4.2	1.1		
	2695	BCUL	1 S	1725	1726	2	4	1		
	2800	OTTA	1 S	1849	1854	8	2	1		
	2695	PENT	22 GRF	2140	2310	230 D	8.6			
21	2695	MANI	22 GRF	0724.8	0736.4	33.2	35.8	23.8		
	2800	OTTA	23 GRF	1527	1657	170	4.2	2.1		
	2800	OTTA	20 GRF	1640	1643	12	5.2	1.8		

SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS
APRIL 1978

APR 1978	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	REMARKS
	2800	OTTA	20 GRF	2057	2137	60	2.8	1.4		
22	2800	OTTA	21 GRF	1420	1500	120	2	1.2		
	2800	OTTA	1 S	1515.9	1516	1.5	2.2	.8		
	2695	BCUL	40 F	1809	1816.5	76.5	39	13		
	2800	OTTA	240 R	1845	1900	15	2	1		
	2800	OTTA	20 GRF	2025	2035	20	2.2	1.1		
	2695	BCUL	40 F	2225.5	2321	2339.5	72	24		
23	2695	PENT	1 S	0036.5	0036.9	1	2.8	1.4		
	2695	BCUL	1 S	0037	0037.5	1	4	1		
	8800	MANI	47 GB	0424 E	0504.2	90.2D	3900	2500		I
	2695	MANI	47 GB	0422.3	0459.5	94.2	4500	3200		
	8800	MANI	4 S/F	0904.7	0905.3	6.4	42.7	26.5		I
	2695	MANI	4 S/F	0904.8	0905.2	2.3	34.3	22.9		
	2800	OTTA	22 GRF	1117	1125	22	3.4	1.7		
	2800	OTTA	21 GRF	1140		310	12			
	2800	OTTA	1 S	1308	1308.9	3	3.6	1.6		
	2695	BCUL	41 F	1704 E	1708	11.5D	78	26		
	2800	OTTA	1 S	1739	1739.6	3.5	2	1		
	2800	OTTA	45 C	2011.5	2027	27	13.2	8		
	2800	OTTA	2 S/F	2046.5	2047	1.2	5.2	1.8		
24	2800	OTTA	21 GRF	1125	1150	145	4.8			
	2800	OTTA	1 S	1324	1325.5	4	3.2	1.4		
	2800	OTTA	21 GRF	1420	1503	105 D	4.8			
	2800	OTTA	1A S	1442.5	1443.5	1.5	1.4	.7		
	2695	BCUL	49 GB	1540 E	1542.5	15 D	4509	1503		
	2800	OTTA	22 GRF	1842	1845	16	4.2	1.4		
	2800	OTTA	32 ABS	2040	2047	20	-1.8	-.9		
	2800	OTTA	20 GRF	2101	2120	40	2.8	1.6		
	2800	OTTA	240 R	2142	2156	14	2.8	1.4		
	2800	OTTA	20 GRF	2202	2210	20	1.4	.9		
25	8800	MANI	3 S	0451	0452.2	2.5	80.5	53.7		
	2800	OTTA	20 GRF	1150	1213	40	2.6	1.3		
	2800	OTTA	23 GRF	1317	1329	45 D	3.2			
	2800	OTTA	2 S/F	1337	1338	3	4	2		
	2695	PENT	1 S	1420.1	1420.9	1	2.8	1.4		
	2800	OTTA	20 GRF	1513.5	1518	16	3.2	1.6		
	2800	OTTA	21 GRF	1530	1633	210	7.8	3.9		
	2800	OTTA	47 GB	1539	1541	7	3800	225		
	2800	OTTA	29 PBI	1546	1546	30	10.8	3.6		
	2800	OTTA	21 GRF	1654	1708	65	4	2		
	2800	OTTA	1 S	1658	1700	4	5.6	2.8		
	2800	OTTA	20 GRF	1925	1936	25	3.2	1.6		
	2695	PENT	240 R	2015	2050	35	4.2	2.1		
	8800	MANI	4 S/F	2211.5	2212.3	3.2	168.1	112.1		
	2695	MANI	4 S/F	2211.5	2212.4	6.1	20.9	13.9		
	2695	PENT	46F C	2211.6	2212.5	11	28.8	5.8		
	2695	BCUL	3 S	2212 E	2213	5.5D	26	9		
	2695	PENT	20 GRF	2305	2318	55	5.6	2.8		
26	2800	OTTA	240AR	1245	1310	25	3.2	1.6		
	2800	OTTA	1 S	1300	1300.5	3	3.4	1.1		
	2800	OTTA	21 GRF	1340	1353	28 D	2.2			
	2800	OTTA	40 F	1340.5	1342.5	8.5	2.8			
	2800	OTTA	20 GRF	1430	1455	120	4.8	2.4		
	2800	OTTA	2 S/F	1636	1636.7	1.5	1	.5		
	2800	OTTA	2 S/F	1856	1856.3	2	8.4	2.4		
	2800	OTTA	21 GRF	1940	2000	125	9	4.6		
	2800	OTTA	3 S	1940.5	1940.7	1	13.2	6.6		
	2800	OTTA	46F C	1942.9	1943	1.5	6.2	3.1		
	2800	OTTA	1 S	1956	1957.2	3	5	2.2		
	2695	PENT	20 GRF	2215	2310	135	5.8	3.2		
27	2695	PENT	45 C	0035.8	0036	6	7.8			
	2695	PENT	4 S/F	0051.3	0052.2	2	13.4	6.7		
	2695	MANI	4 S/F	0308.3	0309.2	1.4	39.7	26.5		
	2800	OTTA	240 R	1302	1335	33	2.6	1.3		
	2800	OTTA	1 S	1445.2	1446	1	1.2	.6		
	2800	OTTA	21 GRF	1455	1510	80	2	1.2		
	2800	OTTA	3 S	1605	1606	2	12	3		
	2695	BCUL	1 S	1606 E	1607	4 D	5	2		
	2800	OTTA	20 GRF	1640	1713	65	2.6	1.3		
	2800	OTTA	24P R	1730		108	2.6			
	2800	OTTA	27F RF	1750		150	2.6	2.2		
	2800	OTTA	24 R	1750	1830	40	2.6	1.3		
	2800	OTTA	26 FAL	2010	2020	10	-2.6	-1.3		
	2800	OTTA	3 S	2042.1	2042.5	4	16	5		
	2800	OTTA	21 GRF	2045		35	4	3.1		
	2800	OTTA	1 S	2106	2107.5	3	3.2	1.5		
28	2695	PENT	3 S	0009	0010.5	23	295	34		
	2695	MANI	4 S/F	0009.8	0010.7	13.2	251.1	167.4		

SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS

APRIL 1978

APR 1978	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	REMARKS
	8800	MANI	4 S/F	0010	0010.7	6.2	212.1	141.4		
	2695	PENT	29 PBI	0032	0032	55	4.8	2.4		
	8800	MANI	3 S	0643.1	0643.7	2.3	251.1	167.4		
	2800	OTTA	1 S	1201	1201.9	2	4.8	2		
	2800	OTTA	22 GRF	1205	1220	45	7	3.5		
	2800	OTTA	47 GB	1308	1354.5	75	2000	1500		
	2695	BCUL	49 GB	1310 E	1355.5	79.5D	20776	6925		
	2800	OTTA	30 PBI	1423	1423	515	81	23		
	2800	OTTA	4 S/F	1433	1440	13	13.8	8.3		
	2800	OTTA	2 S/F	1449	1453	7	6.4	2.9		
	2800	OTTA	45 C	1506	1523	33	96	34		
	2695	BCUL	20 GRF	1507 E	1525	64	123	41		
	2800	OTTA	45 C	1549	1604	21	20.4	12.8		
	2800	OTTA	22 GRF	1624	1634	18	8	4		
	2800	OTTA	1 S	1652	1653	3	2.6	1.3		
	2800	OTTA		1712	1714.5	5 D	6.4			
	2800	OTTA	20 GRF	1722	1734	26	6.4	3.8		
	2800	OTTA	23 GRF	1749	1755	13	4.2	2.1		
	2800	OTTA	1 S	1757.2	1757.5	1	3.2	1.6		
	2800	OTTA	1 S	1812	1812.5	2	2	1		
	2800	OTTA	22 GRF	1831	1841	22	6.4	3		
	2800	OTTA	21 GRF	1943	1946	25	3.2	1.8		
	2800	OTTA	2 S/F	2002.3	2002.5	3	4.2	2.4		
	2800	OTTA	20 GRF	2010	2025	25	2.8	1.6		
	2695	BCUL	3 S	2410.5E	2411.5	23.5D	341	114		
29	2800	OTTA	23 GRF	1545	1832	475	8.2			
	2800	OTTA	47 GB	1852	1939	98	3585	916		
	2695	BCUL	49 GB	1855.5E	1940.5	96	5019	1673		
	2800	OTTA	30 PBI	2030	2030	190	22	7.4		
	2800	OTTA	21 GRF	2114	2126	50	3.2	1.6		
	2800	OTTA	2 S/F	2114.5	2116	6	9	4.5		
30	2695	MANI	1 S	0454.8	0455.6	.8	6	7		
	8800	MANI	3 S	0948.8U	0949.4	1.9U	193.2	124.7		NSET
	2800	OTTA	28 PRE	1321	1427	78	51			
	2695	BCUL	28 PRE	1422 E	1428	17.5D	36	12		
	2800	OTTA	47 GB	1439	1458.5	96	1265	381		
	2695	BCUL	49 GB	1439.5E	1459.5	144.5D	1514	505		
	2800	OTTA	30 PBI	1615	1615	605	50	12.8		
	2800	OTTA	4 S/F	1640	1646	14	35	13.3		
	2800	OTTA	20 GRF	1737	1745	27	8.6	4.3		
	2800	OTTA	21 GRF	2232	2244	45	6.4	3.2		
	2800	OTTA	1 S	2232.5	2235	8	9.6	4.8		

Observatories:

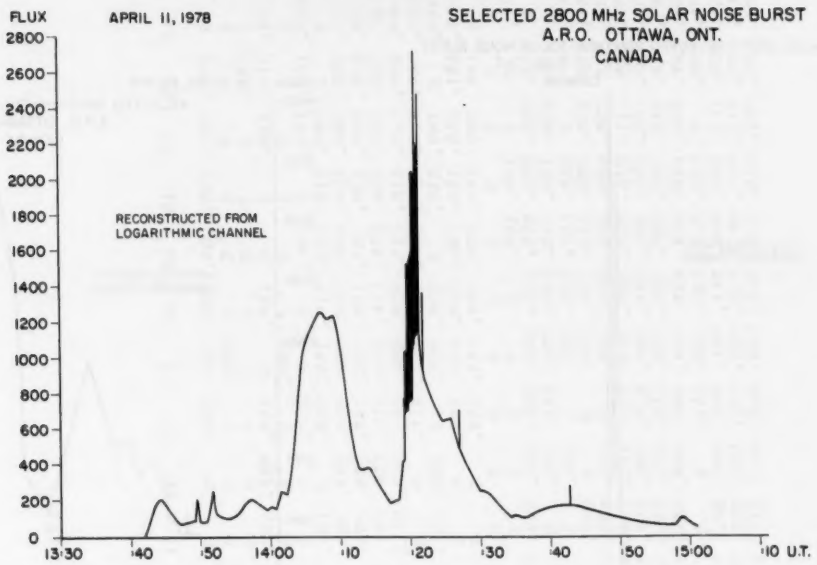
BOUL = Boulder MANI = Manila OTTA = Ottawa ARO PENT = Penticton SGMR = Sagamore Hill

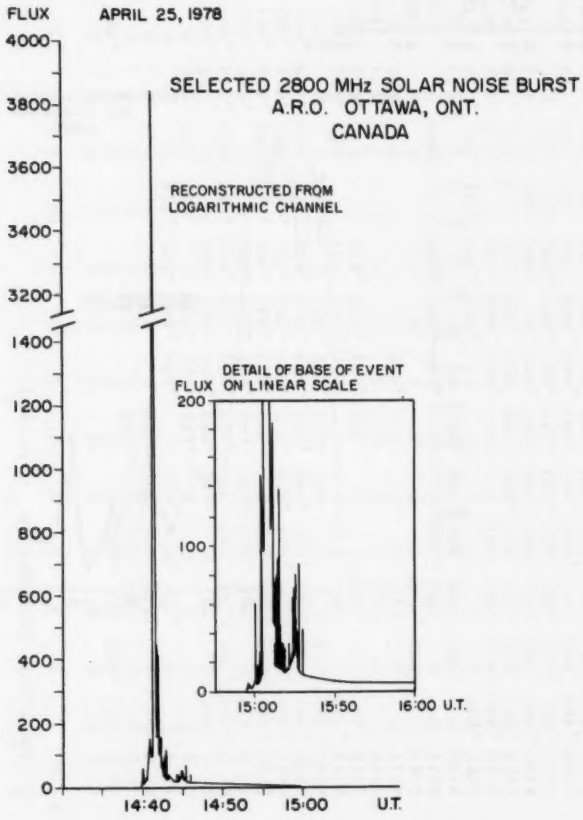
Explanation of Type Code:

1 Simple 1	6 Minor	22 Simple 3F	27 Rise and Fall	32 Absorption	44 Noise Storm in Progress
2 Simple 1F	7 Minor +	23 Simple 3AF	28 Precursor	40 Fluctuation	45 Complex
3 Simple 2	8 Spike	24 Rise	29 Post Burst Increase	41 Group of Bursts	46 Complex F
4 Simple 2F	20 Simple 3	25 Rise A	30 Post Burst Increase A	42 Series of Bursts	47 Great Burst
5 Simple	21 Simple 3A	26 Fall	31 Post Burst Decrease	43 Onset of Noise Storm	48 Major
					49 Major +

SELECTED SOLAR NOISE BURSTS

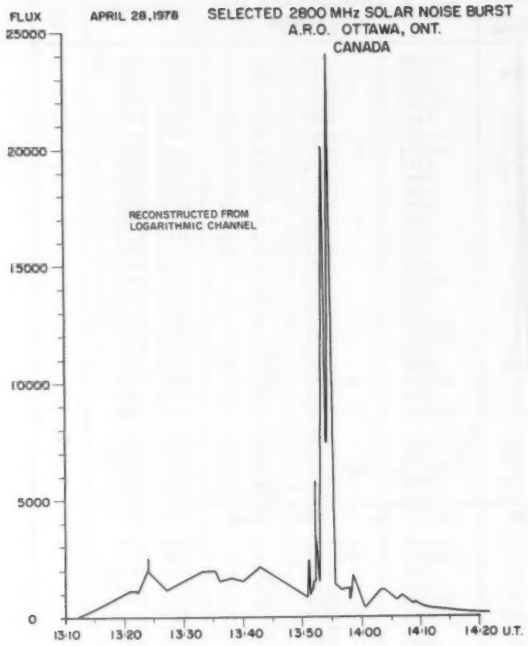
11 - 25 APRIL 1978

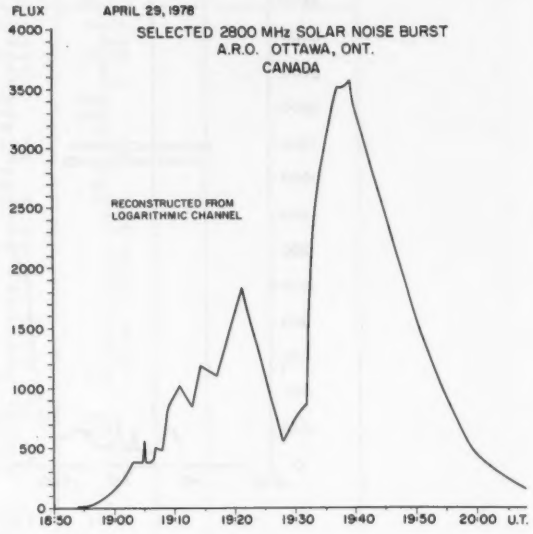


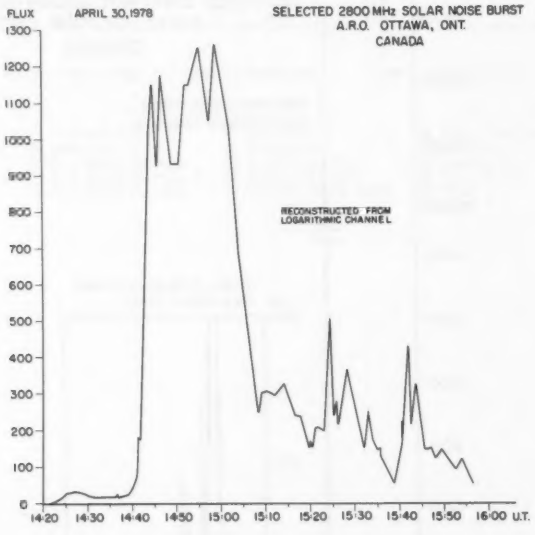


SELECTED SOLAR NOISE BURSTS

28 TO 30 APRIL 1978







SOLAR X-RAYS BY SATELLITE
SMS GOES
APRIL 1978

.5 - 4Å Hourly Averages (10^{-5} watts/m^2)

MO DA	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Mean
4/ 1	B	B	B	B	B	M	B	B	B	B	B	B	B	B	B	B	.005	.011	.002	.002	.001	.001	.001	B	.001
4/ 2	.001	.002	B	.002	B	M	B	B	B	B	B	B	.007	B	B	B	B	.002	B	B	B	B	B	B	B
4/ 3	B	B	.001	.001	B	.001	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	.001	B	B
4/ 4	B	B	.002	.004	B	.005	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
4/ 5	B	B	.001	.015	.003	B	.004	.003	.002	.004	B	B	B	B	.002	.002	.001	B	.001	B	B	.009	.019	.001	.002
4/ 6	B	B	B	B	B	.001	.001	.001	B	.002	.009	.001	B	.001	B	B	B	.001	B	B	B	B	B	B	.002
4/ 7	.004	B	B	B	.001	.005	.005	.007	.002	B	B	.005	.002	.001	.001	B	.518	B	B	.001	B	.001	.001	.002	.022
4/ 8	.001	.021	1.01	.327	.114	.045	.031	.018	.034	.009	.007	.014	.006	.002	.006	.002	.002	.002	.005	.004	.005	.002	.006	.013	.070
4/ 9	.010	B	.010	.011	.007	.008	.013	.003	.002	B	B	.002	.074	1.20	.009	.002	.001	.002	.001	.001	.003	.048	.019	.001	.059
4/10	.001	.002	.010	.003	B	.023	.003	.001	.002	.002	.103	.022	.001	.002	.003	.007	.011	.013	.077	.072	.002	.002	.002	.003	.015
4/11	.004	.003	.001	.003	.021	.010	.010	.006	.004	.004	.009	.011	.009	.394	2.38	.551	.173	.062	.028	.018	.015	.013	.006	.006	.156
4/12	.001	.002	.010	.002	.002	.004	.044	.040	.001	.005	.003	.002	.001	.001	B	B	.718	.270	.002	.002	.014	.014	.007	.002	.049
4/13	.012	.003	B	B	.009	.011	.001	.001	B	.001	B	B	.002	.005	.003	.003	B	.006	.002	B	.002	.001	B	.006	.003
4/14	.005	B	B	B	B	B	B	.002	.011	B	.008	.006	.001	B	B	B	.001	.004	.006	.001	.001	.002	.104	.034	.009
4/15	.001	.007	.006	B	B	.002	.023	.002	.014	B	B	.003	.003	B	B	B	.002	.009	.006	.002	.002	.002	.001	B	.004
4/16	B	B	B	B	B	B	B	B	B	.017	B	.001	.002	B	B	B	B	B	B	B	B	B	B	B	.001
4/17	B	B	B	B	B	B	.002	B	B	B	B	.001	B	B	B	B	B	B	B	.001	.001	B	B	.127	.006
4/18	B	.075	.002	B	B	B	B	B	B	B	B	B	.007	.006	.002	.003	.002	.002	.002	.002	.002	.002	.002	B	.005
4/19	B	B	.003	.002	B	B	.002	.038	.008	.002	.002	B	.003	B	B	.001	.003	.002	.001	.001	.001	.001	.002	B	.003
4/20	B	.004	.002	.002	.002	.001	B	B	B	B	B	.001	B	B	B	.001	B	.001	.003	.004	.002	B	.001	.001	.001
4/21	.001	B	B	B	B	B	B	.021	.009	.001	.001	.012	.013	B	.002	B	B	.002	.009	.003	.009	.004	.002	.001	.004
4/22	.001	.002	.002	.001	B	B	.003	.003	.001	B	.002	.002	.015	.001	.002	.001	B	.001	.002	.002	.004	.002	B	.001	.002
4/23	.002	.002	.002	.003	.068	.970	.900	.476	.239	.133	.084	.050	.033	.023	.019	.016	.012	.010	.010	.008	.459	.114	.018	.008	.153
4/24	.005	.005	.004	.004	.005	.007	.002	B	.001	.002	.001	.003	.001	.003	.001	.001	.010	.002	.002	.002	.002	.001	.003	.001	.003
4/25	.001	.003	.001	.002	.003	.003	.001	.076	.001	.001	.002	B	B	.003	.007	.059	.033	.007	.002	.002	.002	.002	.003	.002	.009
4/26	.002	.002	.002	.003	.002	.005	.002	.003	.003	.002	.002	.002	.001	.007	.002	.002	.002	.001	.002	.038	.034	.002	.007	.004	.006
4/27	.003	.001	.002	.002	.004	.002	.002	.002	.001	.001	.010	.001	.001	B	B	B	.002	.002	.003	.015	.024	M	.002	.005	.004
4/28	.008	.002	.002	.002	.005	.004	.006	.017	.005	.007	.004	.007	.003	4.87	1.92	.585	.296	.185	.130	.089	.065	.051	.035	.025	.346
4/29	.019	.017	.014	.012	.013	.011	.007	.007	.007	.005	.005	.007	.004	.003	.002	.003	.008	.005	.037	3.89	.537	.119	.029	.014	.199
4/30	.009	.009	.010	.007	.010	.004	.003	.004	.018	.019	.005	.004	.003	.013	.719	1.60	.240	.093	.042	.019	.014	.007	.008	.004	.119

Note: "B" indicates the flux was below the cut-off levels.
"M" denotes periods of missing data.

SOLAR X-RAYS BY SATELLITE
SMS GOES
APRIL 1978

1 - 8Å Hourly Averages (10^{-4} watts/m^2)

MO DA	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	DAY
4/ 1	.008	.007	.006	.006	.006	M	.005	.005	.005	.004	.005	.005	-.006	.006	.007	.007	.016	.025	.010	.010	.009	.009	.009	.009	.005
4/ 2	.009	.009	.009	.010	.005	M	.005	.005	.005	.007	.006	.006	-.014	.007	.005	.005	.005	.009	.006	.006	.006	.005	.005	.005	.004
4/ 3	.005	.006	.007	.007	.005	.005	.005	.005	.006	.006	.005	.005	— .005	.005	.005	.008	.005	.005	.005	.006	.006	.006	.007	.007	.003
4/ 4	.007	.007	.010	.016	.009	.012	.007	.008	.006	.008	.008	.007	— .006	.007	.010	.011	.011	.007	.009	.008	.006	.012	.037	.011	.006
4/ 5	.009	.008	.008	.028	.018	.010	.010	.011	.010	.007	.008	— .006	.008	.007	.006	.007	.007	.006	.006	.006	.005	.005	.006	.005	
4/ 6	.006	.006	.006	.007	.006	.008	.008	.009	.009	.010	.024	.010	— .007	.005	.005	.005	.007	.006	.007	.007	.006	.006	.005	.006	.005
4/ 7	.046	.008	.008	.008	.010	.020	.015	.021	.013	.009	.007	.012	— .011	.010	.009	.008	.010	.009	.018	.038	.028	.020	.011	.010	.009
4/ 8	.010	.032	.639	.337	.147	.074	.055	.041	.051	.029	.026	.035	— .026	.019	.024	.018	.016	.015	.023	.028	.020	.019	.023	.034	.071
4/ 9	.029	.018	.029	.031	.023	.032	.038	.021	.014	.011	.011	.016	— .027	.485	.035	.019	.015	.015	.013	.014	.018	.054	.053	.018	.051
4/10	.012	.016	.030	.021	.015	.050	.022	.018	.017	.016	.060	.047	— .014	.018	.019	.028	.024	.035	.145	.073	.015	.015	.014	.022	.023
4/11	.023	.023	.016	.017	.039	.035	.040	.027	.025	.023	.028	.040	— .033	.221	1.54	.581	.228	.111	.066	.052	.045	.040	.028	.027	.147
4/12	.016	.019	.047	.018	.014	.020	.056	.082	.016	.020	.028	.016	— .012	.011	.011	.011	.015	.072	.012	.011	.017	.104	.466	.010	.047
4/13	.029	.016	.008	.008	.007	.007	.007	.008	.018	.007	.019	.013	— .009	.008	.009	.008	.010	.015	.019	.010	.009	.010	.061	.069	.011
4/14	.018	.008	.006	.008	.007	.007	.007	.008	.007	.010	.008	.008	— .011	.018	.014	.017	.007	.018	.010	.008	.009	.008	.008	.015	.008
4/15	.009	.019	.011	.007	.007	.010	.031	.010	.019	.007	.007	.010	— .014	.008	.007	.006	.011	.029	.029	.015	.011	.012	.010	.008	.008
4/16	.007	.006	.006	.006	.007	.006	.006	.005	.005	.021	.006	.007	— .015	.004	.005	.004	.004	.004	.004	.004	.004	.004	.005	.005	.004
4/17	.006	.005	.005	.004	.005	.005	.007	.005	.004	.004	.005	.007	— .004	.005	.005	.004	.004	.004	.004	.004	.007	.008	.006	.010	.008
4/18	.004	.008	.010	.006	.005	.004	.004	.004	.006	.005	.005	.005	— .016	.016	.010	.010	.008	.009	.009	.010	.011	.012	.010	.008	.008
4/19	.008	.007	.011	.012	.009	.007	.010	.059	.032	.014	.010	.006	— .011	.007	.007	.010	.016	.013	.012	.008	.009	.009	.009	.012	.007
4/20	.007	.017	.012	.016	.017	.015	.009	.008	.007	.006	.006	.008	— .007	.007	.009	.011	.006	.009	.013	.017	.010	.007	.008	.010	.006
4/21	.010	.007	.006	.007	.007	.007	.007	.037	.027	.010	.010	.013	— .014	.008	.011	.008	.009	.012	.010	.013	.023	.018	.012	.013	.008
4/22	.011	.012	.032	.010	.009	.009	.014	.014	.010	.010	.014	.013	— .012	.011	.014	.013	.010	.010	.012	.013	.020	.013	.010	.012	.008
4/23	.014	.012	.013	.014	.050	.515	.684	.512	.335	.221	.160	.127	— .093	.074	.064	.057	.045	.038	.037	.035	.265	.148	.056	.035	.152
4/24	.029	.026	.023	.023	.023	.027	.021	.017	.019	.017	.016	.018	— .016	.020	.016	.015	.020	.012	.014	.015	.012	.012	.017	.012	.010
4/25	.012	.017	.013	.014	.016	.016	.011	.015	.011	.011	.013	.010	— .010	.015	.020	.057	.067	.028	.013	.012	.012	.012	.014	.014	.013
4/26	.016	.012	.013	.020	.020	.022	.018	.026	.015	.013	.014	.014	— .012	.019	.017	.018	.017	.012	.012	.042	.058	.014	.026	.019	.012
4/27	.014	.013	.014	.014	.016	.013	.013	.041	.012	.013	.018	.012	— .011	.011	.010	.011	.013	.014	.017	.033	.023	M	.017	.021	.010
4/28	.024	.017	.015	.015	.022	.022	.025	.034	.024	.028	.025	.028	— .023	2.18	1.24	.509	.274	.198	.157	.121	.105	.095	.076	.061	.284
4/29	.053	.050	.044	.037	.038	.036	.029	.029	.029	.025	.026	.027	— .024	.021	.021	.023	.030	.026	.055	1.71	.454	.166	.078	.048	.164
4/30	.034	.032	.032	.028	.034	.025	.022	.022	.033	.046	.028	.022	— .022	.032	.377	1.17	.316	.149	.095	.068	.045	.030	.029	.024	.116

Note: "B" indicates the flux was below the cut-off levels.
"M" denotes periods of missing data.

CORONAL HOLES

Helium D3 Chromosphere at Solar Limb

APRIL 1978

Big Bear Solar Observatory

Only one D3 limb observation was made during the month of April. These data are presented in numerical form rather than graphically.

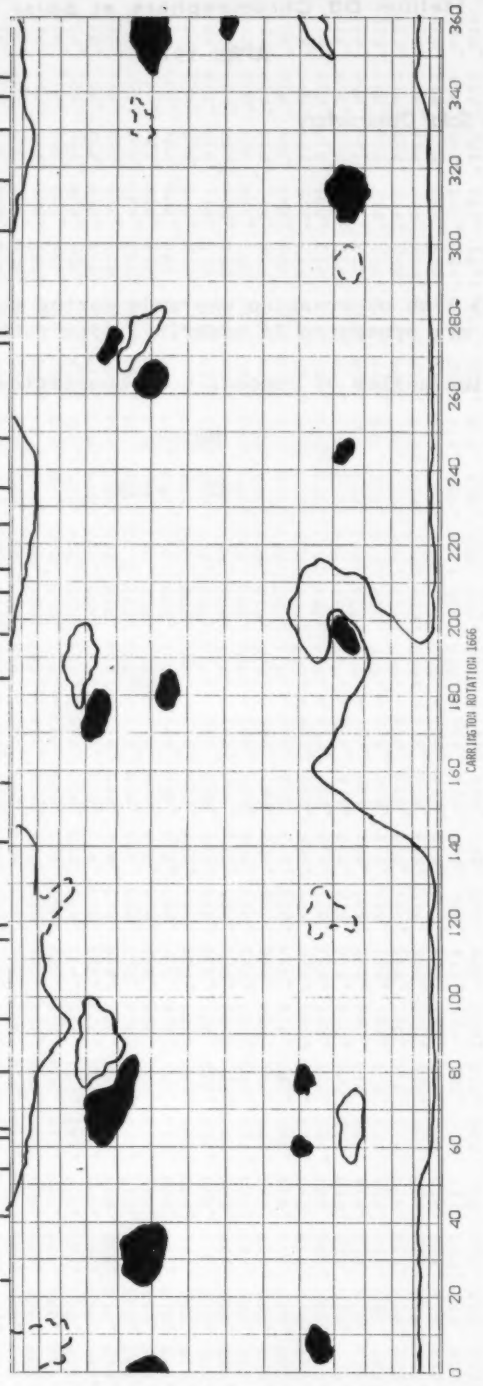
Position angles of coronal hole boundaries (in degrees)

Date	North	South
17 April	151 -169	-9 . 16

HELIUM 10830Å SYNOPTIC MAPS

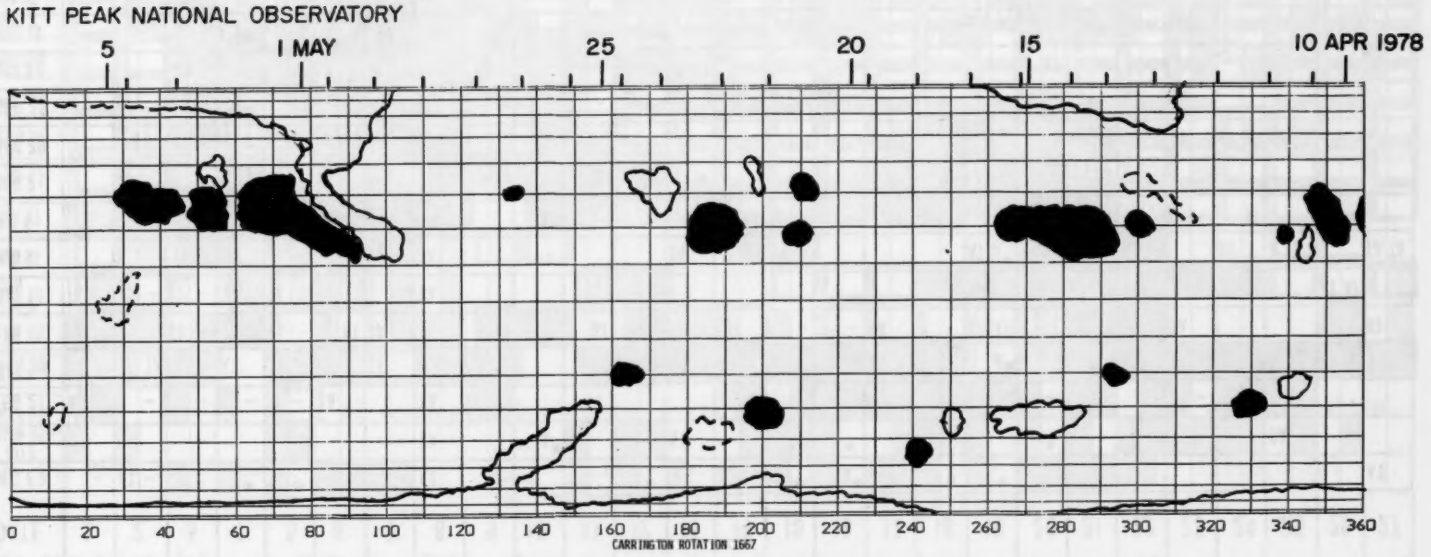
CARRINGTON ROTATION 1666

KITT PEAK NATIONAL OBSERVATORY



HELIUM 10830Å SYNOPTIC MAPS

CARRINGTON ROTATION 1667



INFERRED IP MAGNETIC FIELD

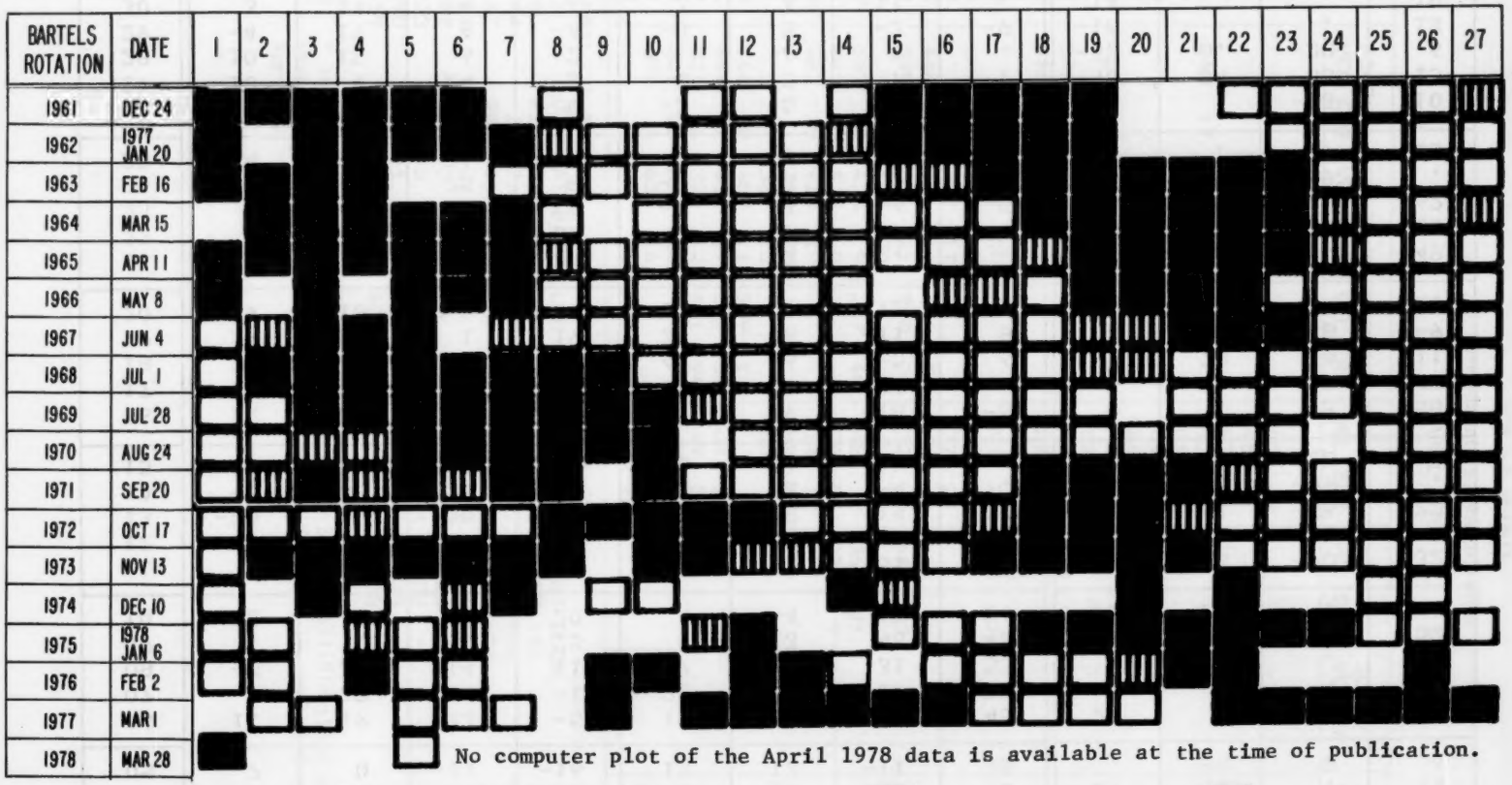
BARTELS ROTATION	DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
1961	DEC 29	. -	AT -	*	*	*			AT				*			*	A*		*	*				*					AT
1962	1977 JAN 25			-			-	-	TA -		A*			AT -			* -				*	-			TA			
1963	FEB 21	AT	-	-	-	-	TA		TA			*									-			-				
1964	MAR 20		TA		AT					*			-	-						A*				-				
1965	APR 16			TA		TA -		AT TA		TA		AT				-	-	TA		AT	AT			TA				AT
1966	MAY 13	TA	-	-		TA			TA											AT	- -	AT	T* -	T*			AT AT	-
1967	JUN 9								TA		-			TA						AT	A*				AT	*	A*		TA TA
1968	JUL 6										A*				T*	TA	TA		T*		AT				-	AT		-	
1969	AUG 2		TA						TA	-				TA	*							AT	TA					
1970	AUG 29			-	-	-		TA										AT	AT			AT	TA	TA	-	AT	AT		
1971	SEP 25						-	-	-	-	-	-					TA				TA							
1972	OCT 22					-	AT														AT	AT				*		
1973	NOV 18			TA	AT						-		AT							*			*		*			
1974	DEC 15				-	-	-		AT -		AT				AT	AT		AT		TA		TA		TA			*	
1975	1978 JAN 11		*	*					*		*	*						*			TA		- AT			-		-
1976	FEB 7						* TA					-			-						-		*		TA	A*	TA	
1977	MAR 6	TA		-					AT			T*	*					TA			AT	AT	AT	AT		* TA			

▒ = definitely towards the sun □ = definitely away from the sun

T = towards the sun A = away from the sun * = effect doubtful or not discernible - = missing data

The table shows daily inferences of the polarity of the interplanetary magnetic field. The first half of the day is based principally on magnetograms produced by the magnetometer at the Vostok Antarctic Station of the USSR. The magnetometer of the U.S. Air Weather Service now operated at Thule by the Danish Meteorological Institute is used for the second half of the day.
Note: The Bartels Rotation numbers after Rotation number 1955 were incorrect in this Table in SGD issues 385 Part I through 389 Part I.
Errata: Thule data for December 5, 6, 10, 11, 12 and 19, 1976 have been corrected.

STANFORD MEAN SOLAR MAGNETIC FIELD



No computer plot of the April 1978 data is available at the time of publication.

POLARITY OF THE MEAN SOLAR MAGNETIC FIELD: □ = FIELD >2μT, ▥ = -2μT ≤FIELD ≤2μT, ■ = FIELD <-2μT

No box visible indicates no data available for that day.

Note: Data are taken daily at 2000 UT. Dates given are not Bartels Rotation dates. These earlier dates correspond to the occurrence of phenomena on the sun which affect the Earth during the given Bartels Rotation.

STANFORD MEAN SOLAR MAGNETIC FIELD (MICROTESLA)

	1977								1978			
	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MARCH	APRIL
DAY												
01	-13	13	2	-16	-9	9	6	-14	.	16	.	52
02	-6	15	-12	-23	-13	6	1	-10	.	31	22	46
03	-5	15	-18	-25	.	3	-14	-7	14	26	12	43
04	1	13	-26	-23	3	13	-16	8	31	.	.	13
05	7	0	-31	-16	12	13	-11	26	.	-5	8	4
06	11	-19	-33	-5	18	11	-1	46	27	4	11	-15
07	7	-32	-26	-1	22	-6	11	55	15	9	4	-32
08	-5	-31	-14	11	17	-13	31	53	.	.	.	-53
09	.	.	-7	25	8	-13	46	46	-1	.	-31	-52
10	-22	0	3	20	4	-4	48	26	11	-28	.	-41
11	.	7	20	17	6	2	51	.	0	-43	-70	-32
12	-29	17	29	12	13	12	32	-2	.	.	-78	-4
13	-20	28	30	11	19	28	14	10	.	-41	-56	22
14	-5	38	24	5	23	35	-4	.	.	-23	-49	.
15	4	40	26	7	40	46	-10	1	.	3	-28	.
16	12	31	18	.	.	39	-18	-6	0	.	-3	58
17	20	24	13	5	38	20	-24	.	-3	31	18	37
18	29	18	4	13	41	6	-5	6	.	22	54	11
19	27	19	1	19	31	6	-11	8	.	37	48	-9
20	19	16	-1	23	17	1	-12	.	18	22	24	-30
21	12	10	6	24	2	3	.	.	39	-1	.	-49
22	.	2	9	22	-3	7	-7	.	10	-18	-23	-50
23	1	-2	22	18	-2	3	-4	-5	-4	-49	-49	-62
24	-1	-7	25	8	-6	-3	0	-1	-15	.	-69	.
25	4	-15	31	4	-1	-9	2	.	-17	.	-79	-13
26	-10	-10	30	0	-3	-5	4	.	-36	.	-73	10
27	-10	4	24	2	-8	-5	7	.	-48	-34	-53	13
28	-10	15	6	-2	.	-6	5	.	-33	.	-28	6
29	-4	19	4	-6	-8	5	-2	-9	-15		.	13
30	3	14	-4	-6	3	6	-11	.	14		.	18
31	6		-10	-11		8		-20	10		.	

Dot symbol entry indicates no data available for the day.

SOLAR WIND

Interplanetary Scintillations

APRIL 1978

DAY	3C48 VEL	3C48 ERR	3C144 VEL	3C144 ERR	3C147 VEL	3C147 ERR	3C161 VEL	3C161 ERR	3C237 VEL	3C237 ERR	3C273 VEL	3C273 ERR	3C298 VEL	3C298 ERR	3C459 VEL	3C459 ERR
1			303	25												
3			428	*			303	*								
4			388	*			445	*								
5			369	*			393	*							400	*
6	246	17	479	*			390	*							257	*
7			315	15			305	*								
8							359	13								
9			273	13			426	37							451	91
10	456	6	404	79	499	46										
11			469	24			459	6								
12	390	39	419	13					534	87						
13	416	5	381	14			427	25							517	6
14			355	13			603	29	600	21					678	130
15			659	100			591	22	347	71					458	22
16			347	19			463	17								
17			387	17			277	27							334	4
18	448	41	360	11	411	21	492	12	556	8					342	94
19	549	15	466	11	298	21	532	6	548	25					426	27
19			446	20												
20	557	10	426	9	367	40	448	18	365	31					359	5
21	449	25	433	9			481	85	398	9					301	10
22	363	19	420	17			314	12							401	43
23			363	70			399	41							392	46
24			387	15			400	8							323	37
25	464	15	400	11	399	13									335	4
26	444	32	433	17	372	66	408	17							308	14
27	421	6	325	12	421	94	549	30							384	4
28	501	50	353	25			319	35							346	12
29	401	6	630	16			311	5							301	18
30							690	12								

APRIL 5	UT	LAT	DIST	DLON
3C48	21.	36.	0.47	-48.
3C144	1.	-7.	0.93	-22.
3C147	24.	1.	0.95	-16.
3C161	2.	-15.	1.01	-15.
3C237	6.	-7.	1.23	-10.
3C273	8.	-5.	1.30	-2.
3C298	10.	-1.	1.28	3.
3C459	18.	16.	0.44	60.

15	UT	LAT	DIST	DLON
3C48	20.	51.	0.39	-41.
3C144	0.	-7.	0.85	-32.
3C147	23.	5.	0.90	-24.
3C161	2.	-15.	0.96	-15.
3C237	5.	-7.	1.20	-12.
3C273	7.	-4.	1.29	-5.
3C298	9.	-1.	1.29	1.
3C459	18.	11.	0.58	52.

25	UT	LAT	DIST	DLON
3C48	20.	63.	0.36	-7.
3C144	24.	-8.	0.75	-42.
3C147	23.	10.	0.83	-31.
3C161	1.	-19.	0.91	-20.
3C237	4.	-6.	1.16	-13.
3C273	6.	-4.	1.27	-7.
3C298	8.	0.	1.29	-2.
3C459	17.	8.	0.70	43.

NOTE: * indicates data for which no error estimate is available since only two antennas were operating. 3C144 observed at 24 hr. UT April 19, and at 0 hr. UT after April 19.

Dot symbol entry indicates no data available for the day.

BOULDER GEOMAGNETIC SUBSTORM LOG

APRIL 1978

DATE	TIME OF ONSET	DIRECTION	COMMENTS
1	0130	East	Boulder at dusk; auroral zone activity begin
	0210	East	
	0300	East	
	0330	East	
	0455	East	
	0525	East	1st of double-onset SS; weak
	0530	West	2nd of double-onset SS; major
	0735	West	
	0905	West	
	1150	West	
	2050		Boulder on dayside; cusp activity started approximately 1800 UT in Alaska sector
2	0120	East	1st of double onset SS
	0150	East	2nd of double onset SS
	0320	East	1st of double onset SS
	0340	East	2nd of double onset SS
	2050		Boulder on dayside. Cusp activity started approx. 1745 UT in Alaska sector.
3	0440	East	1st of double onset SS
	0525	East	2nd of double onset SS; major
	0845	Centered	1st of double onset SS; minor
	0910	Centered	2nd of double onset SS; major
	1215	West	
	1315	West	
	1600		Boulder on dayside
	1700		" " "
	1815		" " "
	1845		" " "
4	0010	East	
	0030	East	
	0110	East	
	0200	East	
	0300	East	
	0340	East	
	0410	East	1st of double onset SS
	0445	East	2nd of double onset SS
	0615	Centered	1st of multiple onset SS
	0650	Centered	2nd " " " "
	0705	Centered	3rd " " " "
	0725	Centered	4th " " " "
	1610		Boulder daylight: Strong ring current injections.
	1700		" " "
	2050		" " "
	2125		" " "
5	0200	East	
	0425	East	Strong SS
	0345	East	1st of multiple onset SS
	0410	East	2nd " " " "
	0435	East	3rd " " " "
7			Quiet day
8			Quiet day
9	0425	East	
	0645	West	1st of double onset SS
	0710	West	2nd of double onset SS
	0805	West	Weak SS activity
	0850	West	Weak SS activity
10	0510	East	Weak
	1306		SSC - Main segment of mag storm began 1940 UT
11			Mag storm continues through 0900 UT
			1600 UT - global disturbance; strong north of auroral oval and mid-latitudes, moderate along the oval.
12	0105	East	1st of double onset SS
	0145	East	2nd of double onset SS
	0600	East	
	0710	West	
	0950	West	
13	0750	West	Weak
	0905	West	Weak
	1440		Boulder in daylight - SS effect in Alaska and northwest Canada
	1915		Gradual onset of magstorm
14			Mag storm continues through near 1500 UT
			Series of very intense SS 1010 - 1420 UT
15	0015	East	
	0610	East	
	0725	West	1130 - 1530 UT - SS activity confined to auroral oval
16			Weak activity - no distinct onsets
17	0530	East	Series of weak SS progress from east to west along station network
	0605		
	0650	Near center	
	0730	Near center	
	0825	West	
	0855	West	
18	0215	East	Mid-latitude chain shows strong ring current lasting through 0600 UT
	0745	East	Weak
	1720		Entire network shows impulsive response; disturbance lasts through 2215 UT, most noticeable in northern segment of Alaskan chain
19	0500	East	
	0610	East	
	0655	West	Abrupt current reversal
	0730	West	
	0800	West	
	1300		Boulder in daylight; global disturbance 1300-2400 UT
	1440		" " " " "
	1600		" " " " "
	1700		" " " " "
	1825		" " " " "
	2010		" " " " "
	2305		" " " " "
20	0020	East	1st of multiple onset SS
	0050	East	2nd of multiple onset SS
	0120	East	3rd of multiple onset SS; intense
	0145	East	4th of multiple onset SS; intense
	0220	East	5th of multiple onset SS
	0250	East	6th of multiple onset SS
	0315	East	7th of multiple onset SS; intense
	0750	Near center	Weak
	0830	West	
	1540		Boulder daylight
	2120		Boulder daylight; cusp activity northern segment of Alaska chain
21	0600	Near center	
	0700	Near center	
	1200		SS at auroral oval stations, Alaska & NW Canada
	1315		SS at auroral oval stations, Alaska & NW Canada
22			Unsettled; no distinct SS onsets
23	0135	East	
	0500	East	
	0800	West	
	0920	West	
	1410		Boulder daylight; strong ring current injection
	2015		Boulder daylight; cusp activity through 2400 UT
24	0125	East	1st of multiple onset SS
	0220	East	2nd " " " "
	0230	East	3rd " " " "
	0250	East	4th " " " "
	0325	East	5th " " " "
	0355	East	6th " " " "
	0450	East	7th " " " "
	0505	East	1st of multiple onset SS
	0550	East	2nd " " " "
	0610	East	3rd " " " ", major
	0840	East	
	1040	West	
	1155	West	
	1315		Boulder daylight
	1355		" "
	1435		" "
	1615		" "
	2255	East	Partial ring current injection
25	0130	East	
	0230	East	
	0725	West	1st of multiple onset SS
	0800	West	2nd " " " "
	0825	West	3rd " " " "
	0855	West	4th " " " "
	1155	West	
	1210	West	
	1640		Boulder daylight
26	0145	East	
	0345	East	
	0425	East	
	0525	East	
	0615	West	
	0740	West	
27	0130	East	1st of double onset SS, weak
	0150	East	2nd " " " "
	1050	West	
28	0200	East	
	0300	East	1st of double onset SS
	0325	East	2nd " " " "
	0410	East	
29	1300		Boulder daylight
30	0952		SSC - magstorm intense through 1800 UT strong activity reinitiated north of auroral oval after 2000 UT.

IMS NORTH AMERICAN MAGNETOMETER NETWORK

The IMS (International Magnetosphere Study) North American Magnetometer Network is neither exclusively N. American nor entirely composed of magnetometer installations. The lists below contain locations in S. America, the Caribbean and the Pacific Ocean. In addition to magnetometers and riometers, at some sites there are all-sky cameras, ionosondes, photometers and auroral backscatter or incoherent scatter radar units.

The Department of Energy, Mines and Resources (EMR), Canada, and the U.S. Geological Survey operate the principal networks of magnetic observatories on the N. American continent and some W. Hemisphere island sites. From time-to-time these have been supplemented by observations made by university or industrial research groups. The 1974 report "International Magnetospheric Study --- Detailed Plan for a U.S. Ground-Based Research Program" (National Academy of Sciences) recommended that the U.S. National Science Foundation support the creation of a number of digital magnetic observatories in the auroral zone of N. America and at a few other sites. In cooperation with the Canadian government (EMR) and the University of Alberta, this effort is being integrated with their IMS programs. Three meridional chains and one longitudinal chain of magnetometers (and riometers) are operated at high latitudes and a widely-spaced longitudinal network at midlatitude. Data from as many as 25 of the sites are collected by relay from the instrument platforms to the SMS/GOES satellites then to the Space Environment Laboratory of NOAA's Environmental Research Laboratories in Boulder, Colorado U.S.A. These data are available in quick-time through the SELDADS system and transferred to the World Data Center A for Solar-Terrestrial Physics/National Geophysical and Solar-Terrestrial Data Center of NOAA's Environmental Data Service. From the data center they will be distributed upon request in magnetic tape, printed or microfilm format. The first satellite telemetry relay of magnetometer and riometer data was of February 1978 data.

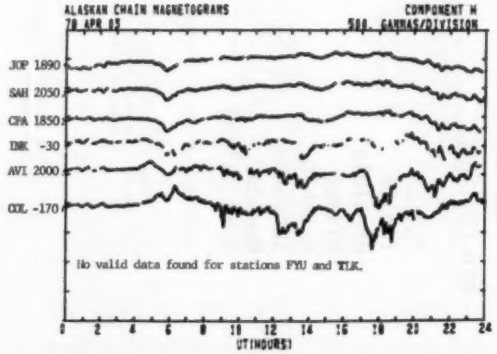
Data from the following chains of stations are currently being received at the Data Center:

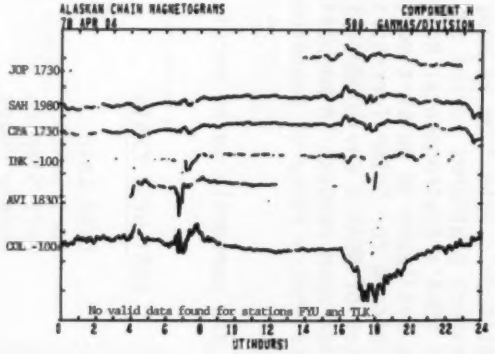
ALASKAN CHAIN	Van Sabben 3-letter code
Fort Yukon	FYU
Talkeetna	TLK
Johnson Point	JOP
Sachs Harbor	SAH
Cape Prince Alfred	CPA
Inuvik	INK
Arctic Village	AVI
College	COL
FORT CHURCHILL CHAIN	
Pelly Bay	PEB
Gillam	GIM
Rankin Inlet	RIT
Eskimo Point	EKP
Baker Lake	BLC
Island Lake	ISL

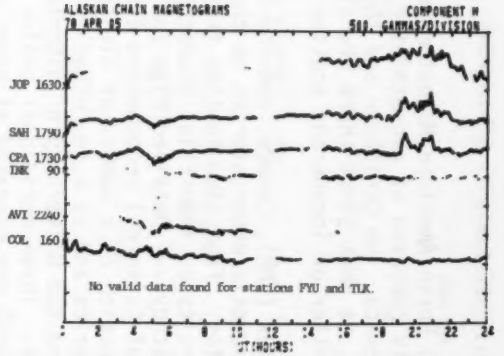
EAST-WEST CHAIN	Van Sabben 3-letter code
Lynn Lake	LYN
Fort Smith	FSM
Fort Simpson	FSP
Norway House	NHO
MID-LATITUDE	
Tucson	TUC
Tahiti	TAH
Honolulu	HON
Midway	MDY
Eusebio	EUS
San Juan	SJG
Boulder	BOU
Wake Island	WKE

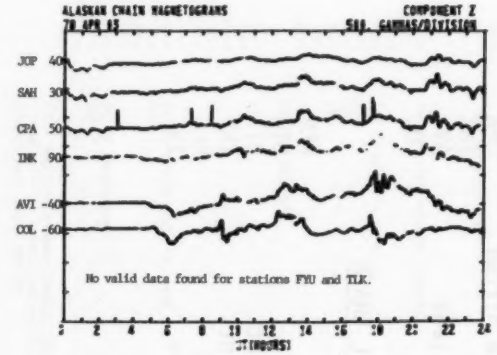
ALASKAN CHAIN MAGNETOGRAMS H and Z COMPONENTS

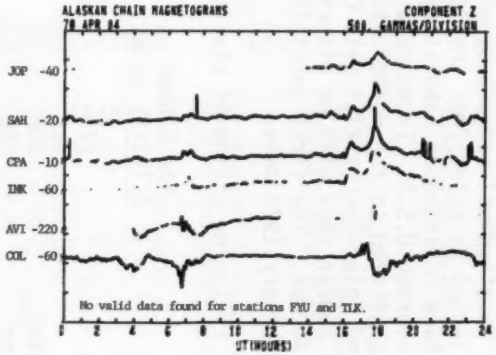
3 - 5 APRIL 1978

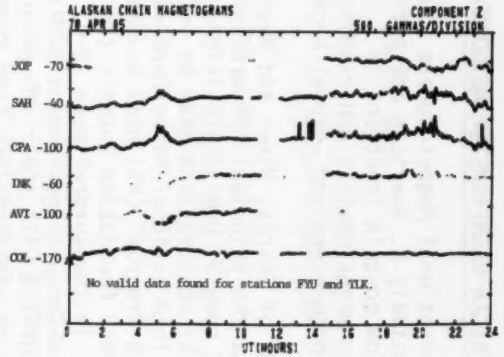






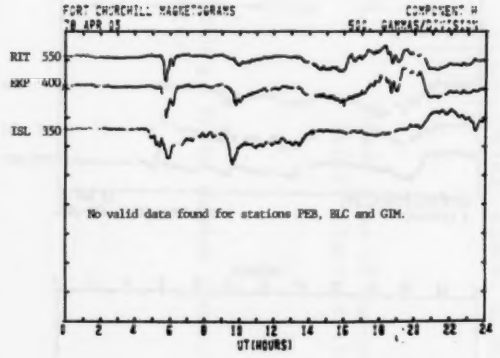


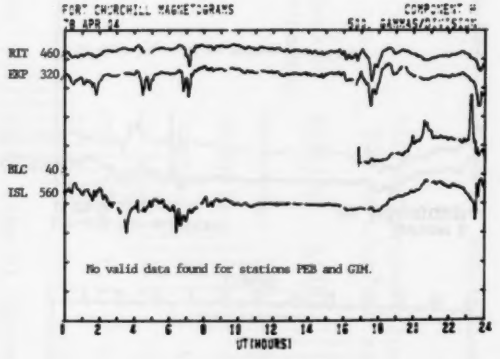


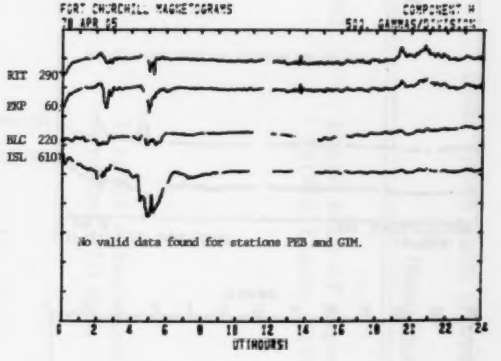


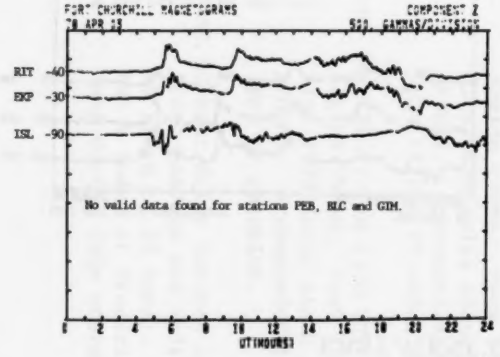
FORT CHURCHILL CHAIN MAGNETOGRAMS H and Z COMPONENTS

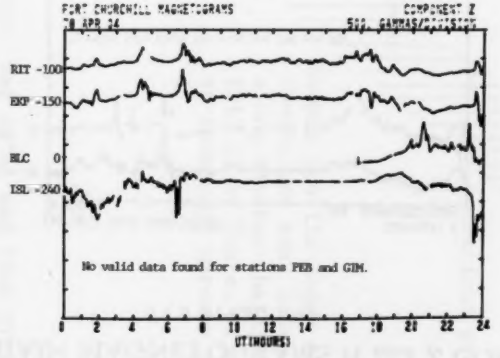
3 - 5 APRIL 1978

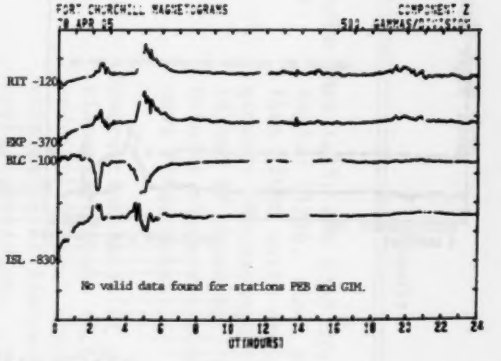






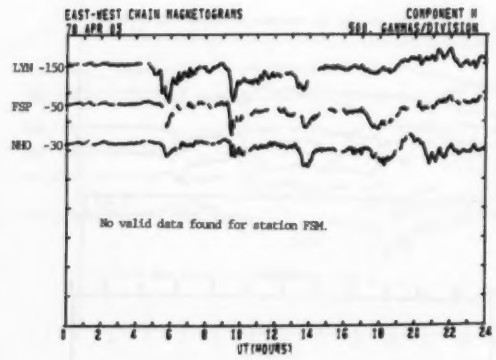


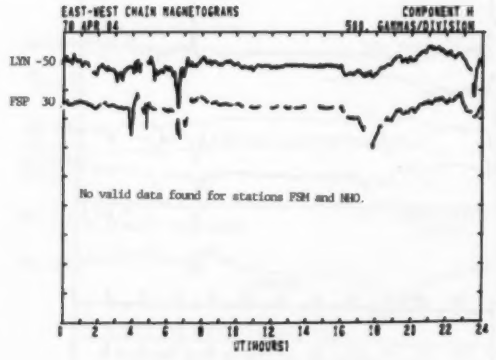


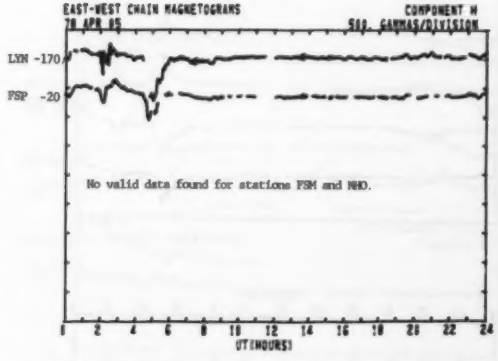


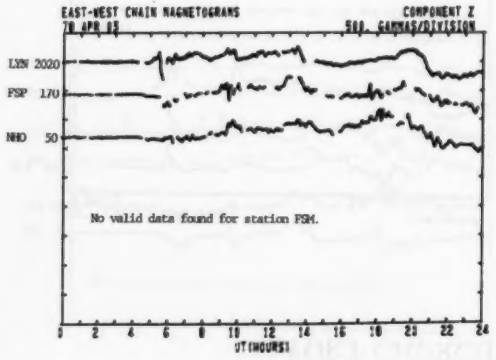
EAST-WEST CHAIN MAGNETOGRAMS H and Z COMPONENTS

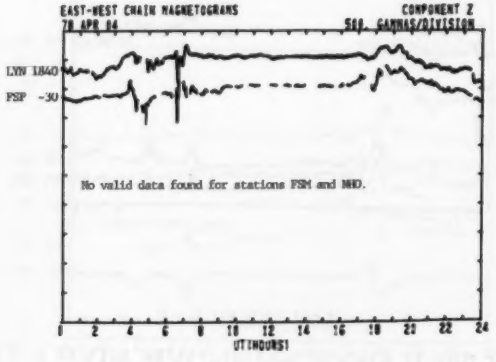
3 - 5 APRIL 1978

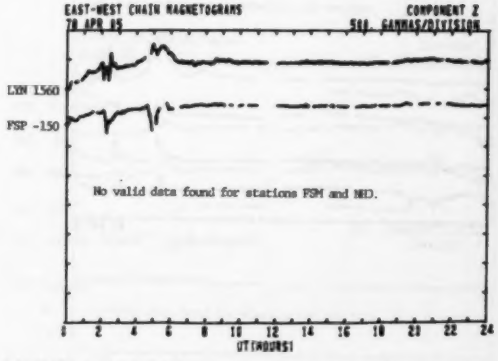












Solar Proton Event (Provisional) April 1978

Date/Time(UT)	Detector	Observation	Remarks
April			
28/1306	Hα patrol.	Start time of importance 4b(X5) flare; N22E41.	Max 1335; end 1359 UT; McMath Region 15266. Peak 10-cm flux 22000 units above background. Accompanied by Type II and IV emission. No U-burst signature over microwave frequencies.
28/1800	GOES-2.	Initial enhancement of protons >10 MeV.	Observations made at geostationary altitude (6.67 Earth radii). Gradual onset characteristic of flares east of central meridian.
28/1730	Thule 30 MHz riometer.	Onset of absorption.	Daylight conditions prevailed.
28/1730	GOES-2.	>10 MeV proton flux about 200 part/cm^{2}sec ster.	
28/2100	Thule/Alaskan 30 MHz riometer chain.	Station A(dB) L Anchorage 0.9 4.2 Sheep Mt. 0.5 4.5 Paxson 0.3 5.0 College 0.5 5.5 Ft. Yukon 1.3 6.5 Thule 1.7 >50	Sample profile under daylight conditions near local noon along Alaskan chain; about 2015 LT at Thule. K index at Anchorage between 2 and 3.
29/1815	Hα patrol.	Start time of importance 3b(X3) flare; N16E16.	Max 1924; end 1946 UT; McMath Region 15266. Peak 10-cm flux 4400 units above background. Accompanied by Type II and IV emission.
30/1439	Hα patrol.	Start time of importance 3b(X2) flare; N24E11.	Max 1452; end 1530 UT; McMath Region 15266. Peak 10-cm flux 2900 units above background. Accompanied by Type IV emission.
30/0952	Fredericksburg magnetometer.	Storm sudden commencement.	45-hour delay between shock front passage and initiating 4b flare on 28 April. Highest K index at Fredericksburg during this storm was 6.

Solar Proton Event (Provisional) April 1978

Date/Time(UT)	Detector	Observation	Remarks
April 30/1000-1100	GOES-2.	Arrival of storm-time particles.	Evident on low energy proton channels.
30/2145	Thule/Alaskan 30 MHz riometer chain.	Station A(dB) L Anchorage 0.6 4.2 Sheep Mt. 2.3 4.5 Paxson 2.5 5.0 College 5.7 5.5 Ft. Yukon 8.4 6.5 Thule 7.2 >50	Sample profile near time of max proton flux recorded at synchronous altitude. K index at Anchorage was 4. Anchorage and Thule local times about 1245 and 2100, respectively, under daylight conditions.
30/2200-2300	GOES-2.	Peak proton flux on all channels.	Max flux recorded during this 4-day period of energetic flare activity. Flux >10 MeV about 1500 part/cm^{2}sec ster. Difficult to distinguish separate particle injections for flares following the 4b event of the 28th.
May 01/0230	Boulder magnetometer.	Resurgence in geomagnetic activity.	Gradual onset of geomagnetic storm from the 3b flare of 29 April. K index reached 5 during this 3-hour interval. Start time represents about a 56.5-hour delay.
01/1915	Hα patrol.	Start time of importance 3b(M6) flare; N21W04.	Max 1935; end 1937 UT; McMath Region 15266. Peak 10-cm flux 2200 units above background. Accompanied by Type II and IV emission.
01/2100-2400	Fredericksburg magnetometer.	K index equaled 8.	Gradual storm onset from 3b flare of 30 April.
01/2110	Boulder magnetometer.	Very intense magnetic substorm.	H deviation = +235γ; Z = +210γ. Storm commencement largest of all for the period. Produced by flare that occurred closest to CM. Start time represents about a 54.5-hour delay.

McMath Region 15266 continued to flare at the M X-ray level through 7 May--one day before solar rotation carried it over the west limb. K indices recorded at Fredericksburg did not drop below 4 until the 2100 to 2400 interval on 4 May.

MARCH 1978 DATA

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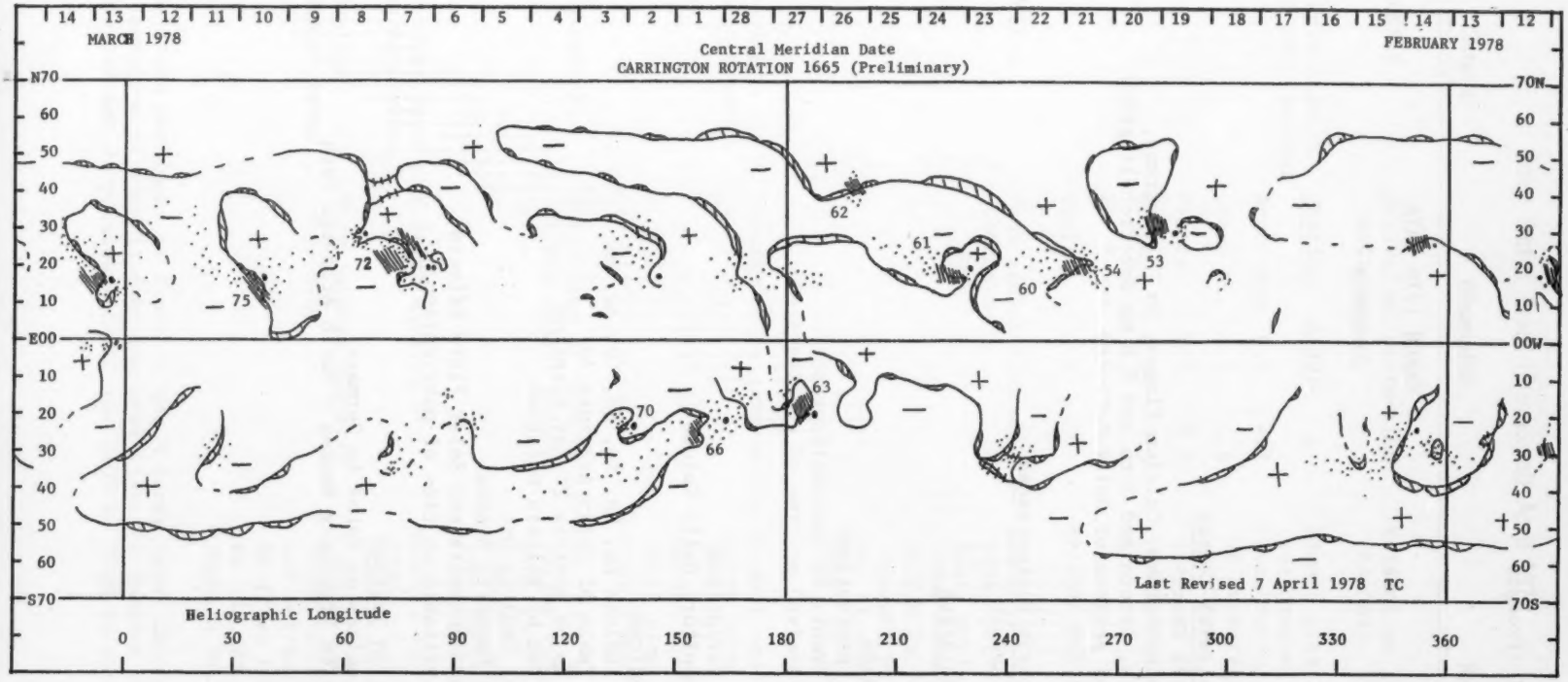
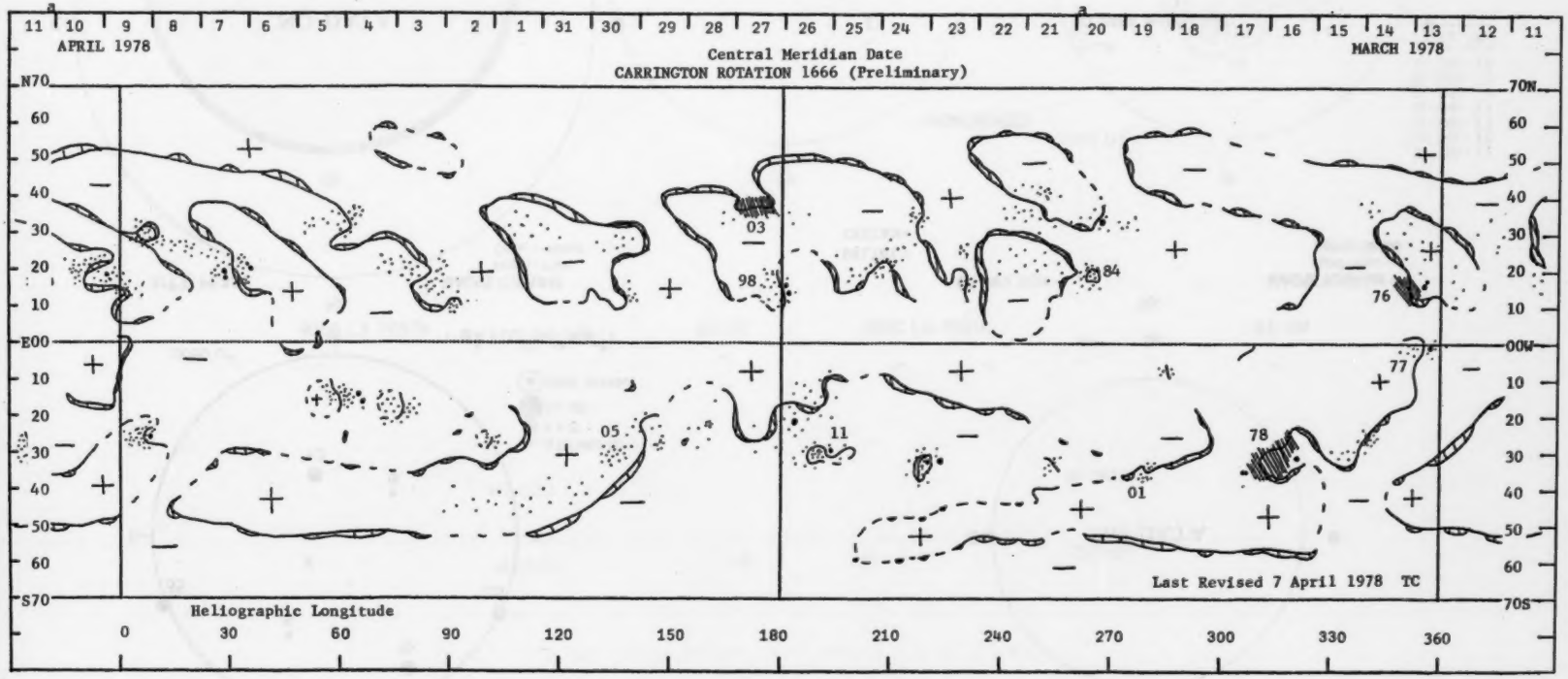
Hα SYNOPTIC CHART

CARRINGTON ROTATION 1665 (PRELIMINARY)



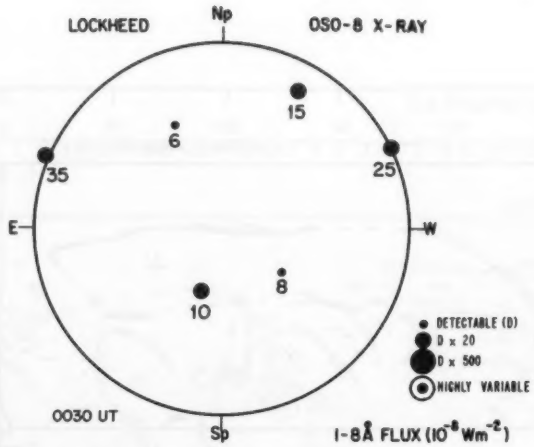
Hα SYNOPTIC CHART
MARCH - APRIL 1978



47
Mar 78

MARCH 1, 1978 (P = -21.48, B_o = -7.22, L_o = 163.40)

LOCKHEED — OSO-8 X-RAY



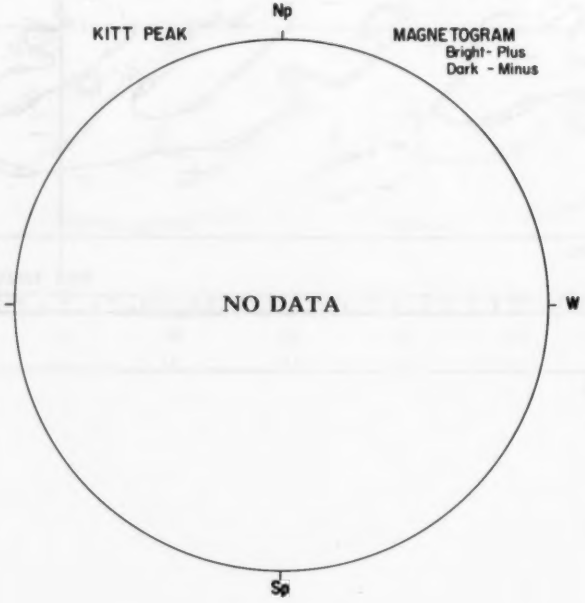
DETECTABLE (D)
D x 20
D x 500
HIGHLY VARIABLE

0030 UT

1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK — CORONA (1.15 $R_\odot$) 5303 Å

KITT PEAK — MAGNETOGRAM
Bright - Plus
Dark - Minus



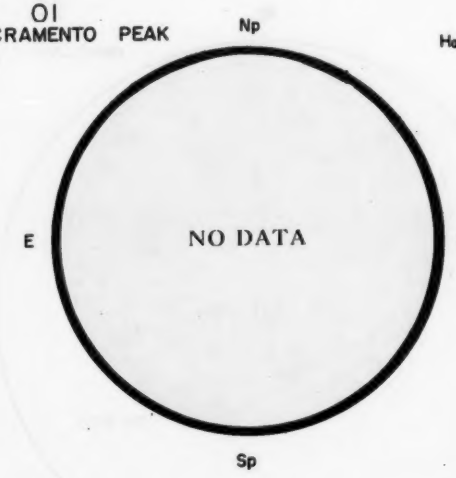
MT. WILSON — MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =

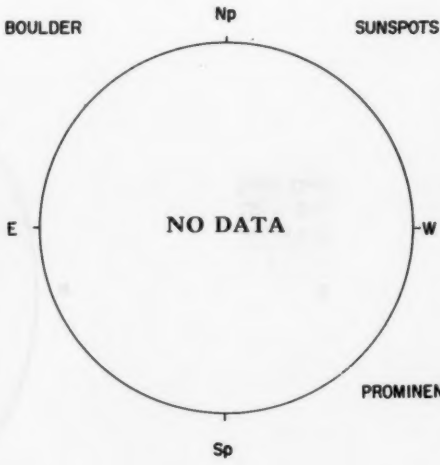
Levels
± 5
± 10
± 20
± 40
± 80

Sp

01
SACRAMENTO PEAK



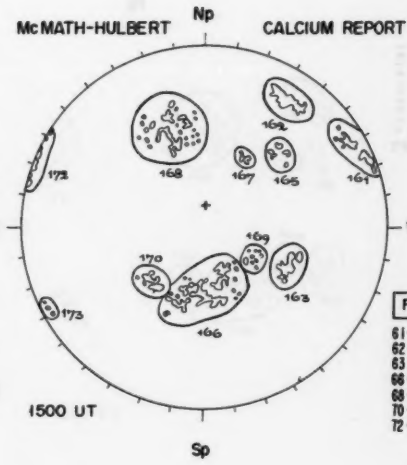
Hα BOULDER



SUNSPOTS

McMATH-HULBERT

CALCIUM REPORT



FAIR | M

61 - 3800 - 3.0
62 - 3400 - 3.5
63 - 1600 - 3.0
66 - 3000 - 3.0
68 - 2500 - 2.5
70 - 0800 - 3.0
72 - 3000 - 4.0

PROMINENCES

1500 UT

NOSC LA POSTA

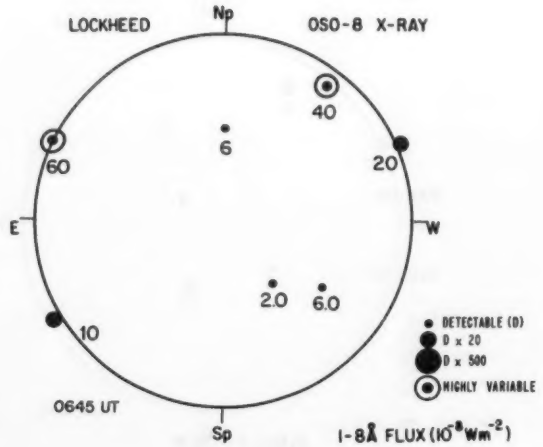
2.0 CM

NOSC LA POSTA

8.6 MM

MARCH 2, 1978 (P=-21.74, B_o=-7.23, L_o=150.23)

LOCKHEED — OSO-8 X-RAY

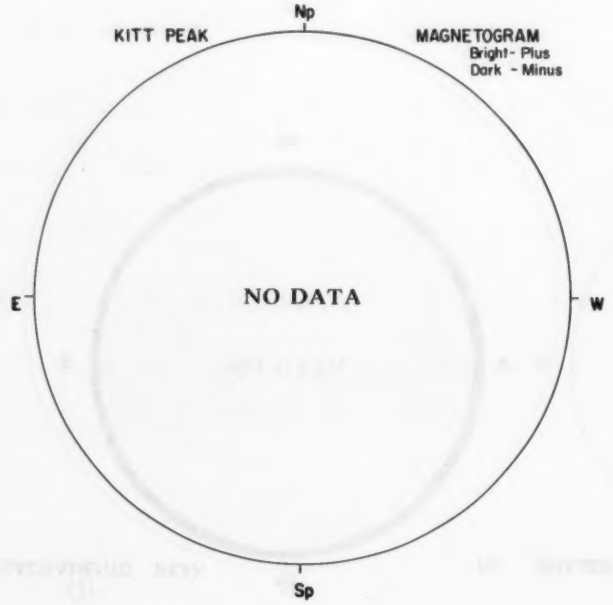


0645 UT

1-8Å FLUX (10^{-8} Wm^{-2})

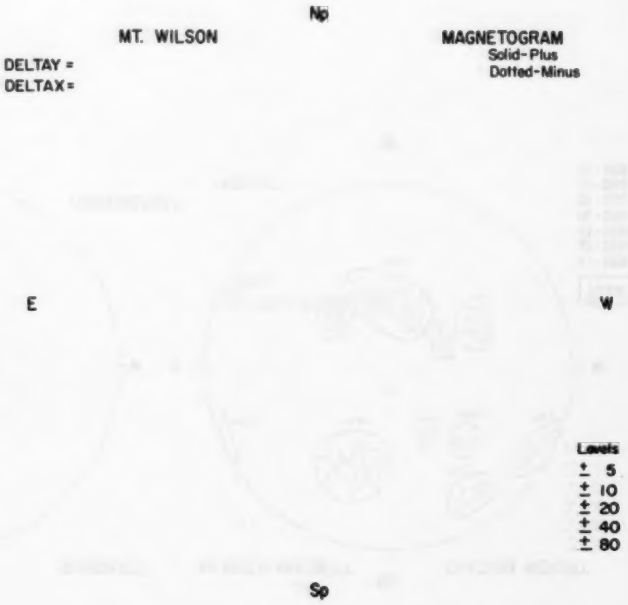
SACRAMENTO PEAK — CORONA (1.15 $R_\odot$) 5303 Å

KITT PEAK — MAGNETOGRAM
Bright - Plus
Dark - Minus



MT. WILSON — MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =

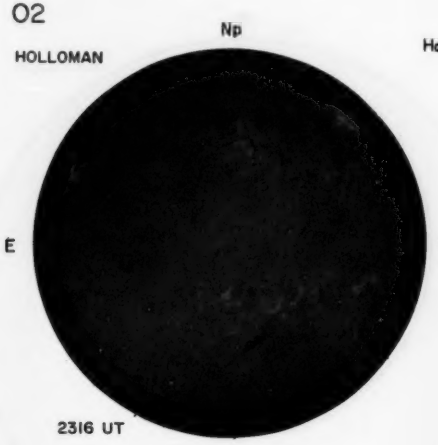


Levels
± 5
± 10
± 20
± 40
± 80

Sp

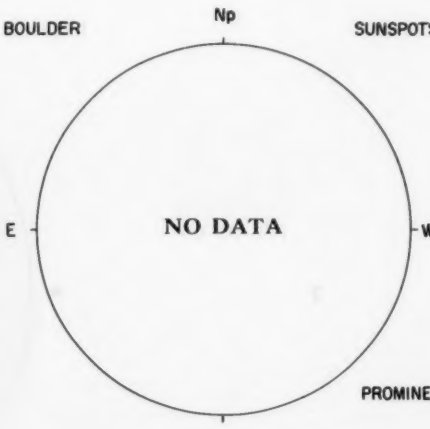
02

HOLLOMAN



2316 UT

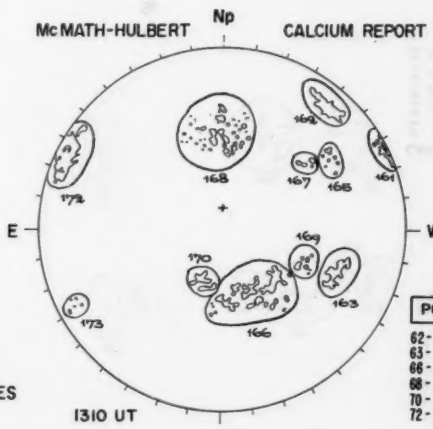
Hα BOULDER



SUNSPOTS

PROMINENCES

McMATH-HULBERT



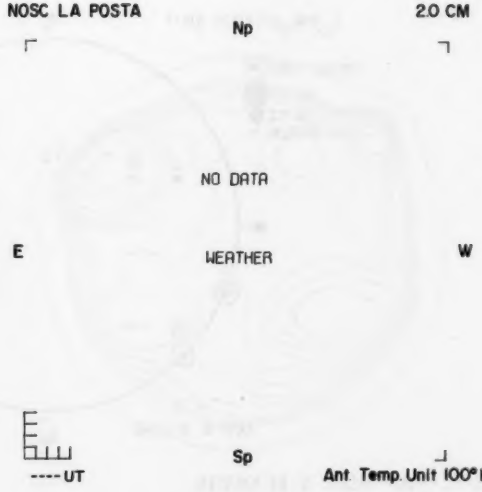
1310 UT

CALCIUM REPORT

POOR	D

62 - 3400 - 3.5
63 - 1600 - 3.0
66 - 3000 - 3.0
68 - 2700 - 2.5
70 - 0800 - 3.0
72 - 6000 - 3.5

NOSC LA POSTA

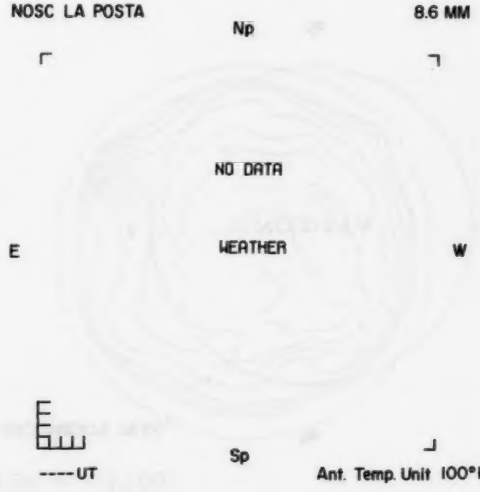


2.0 CM

----UT

Ant. Temp. Unit 100°K

NOSC LA POSTA



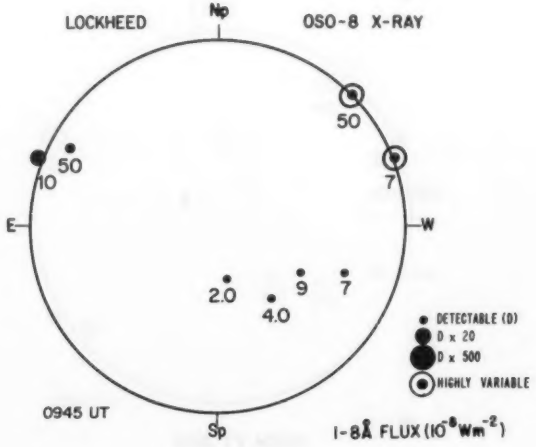
8.6 MM

----UT

Ant. Temp. Unit 100°K

MARCH 3, 1978 (P = -21.98, B_o = -7.24, L_o = 137.05)

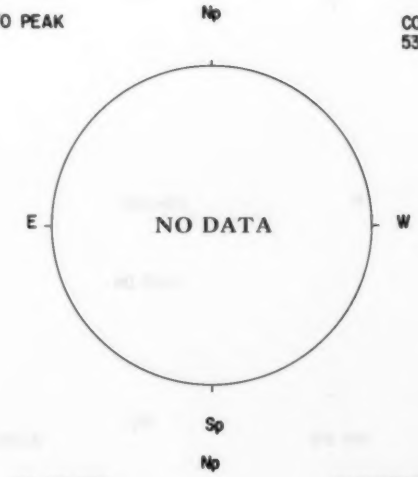
LOCKHEED — OSO-8 X-RAY



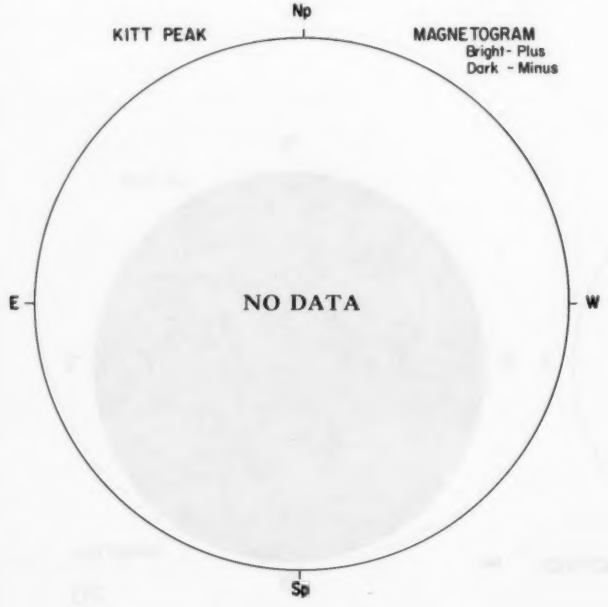
0945 UT

1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK — CORONA (1.15 $R_\odot$) 5303 Å



KITT PEAK — MAGNETOGRAM
Bright - Plus
Dark - Minus



MT. WILSON — MAGNETOGRAM
Solid - Plus
Dotted - Minus

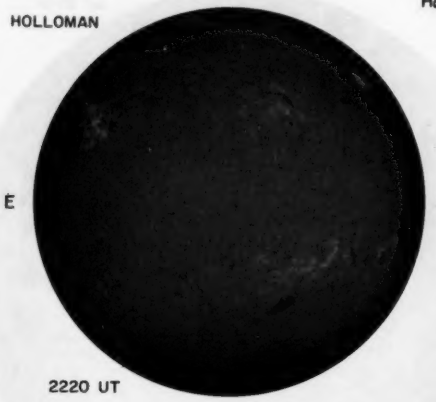
DELTAY =
DELTAX =

Sp

03

Np

HOLLOMAN



E W

2220 UT

Sp

Hα BOULDER

Np

NO DATA

E W

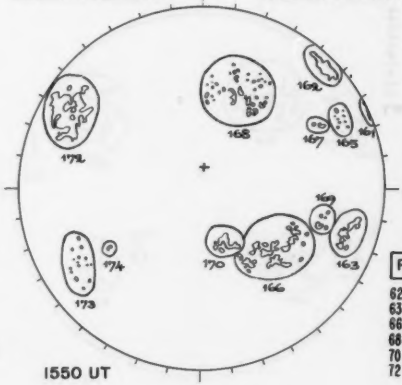
Sp

SUNSPOTS

PROMINENCES

McMATH-HULBERT

Np



E W

Sp

1550 UT

CALCIUM REPORT

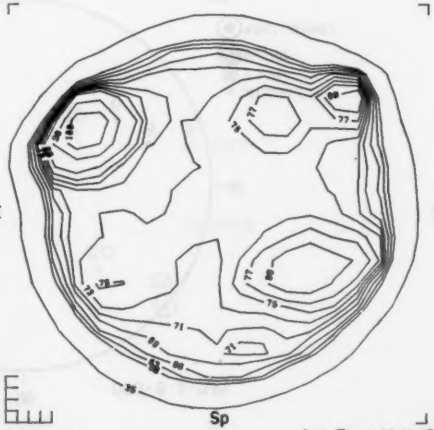
POOR	M

62 - 3400 - 3.5
63 - 1500 - 3.0
66 - 3000 - 2.5
68 - 2500 - 2.5
70 - 0800 - 2.5
72 - 7400 - 3.5

NOSC LA POSTA

2.0 CM

Np



E W

Sp

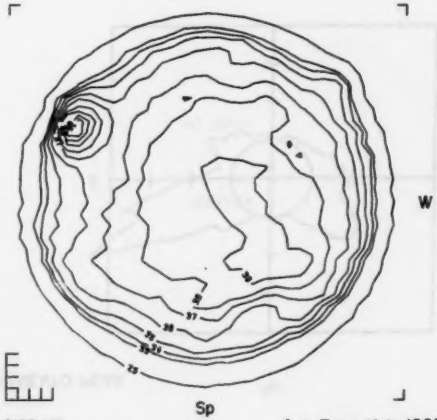
2232 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

Np



E W

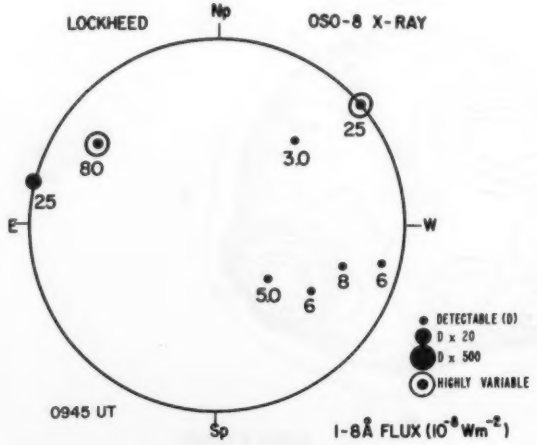
Sp

2123 UT

Ant. Temp. Unit 100°K

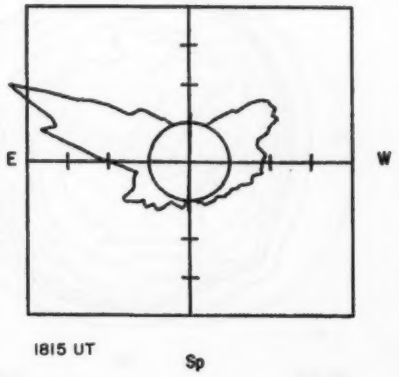
MARCH 4, 1978 (P = -22.22, B_o = -7.24, L_o = 123.88)

LOCKHEED — OSO-8 X-RAY

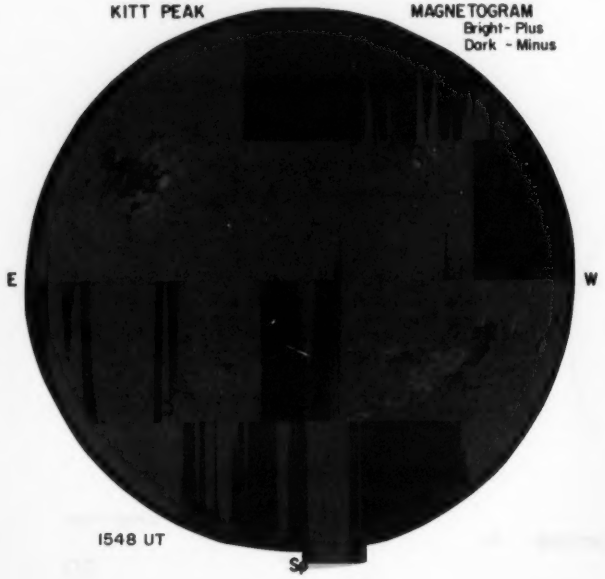


1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK — CORONA (1.15 $R_\odot$) 5303 Å



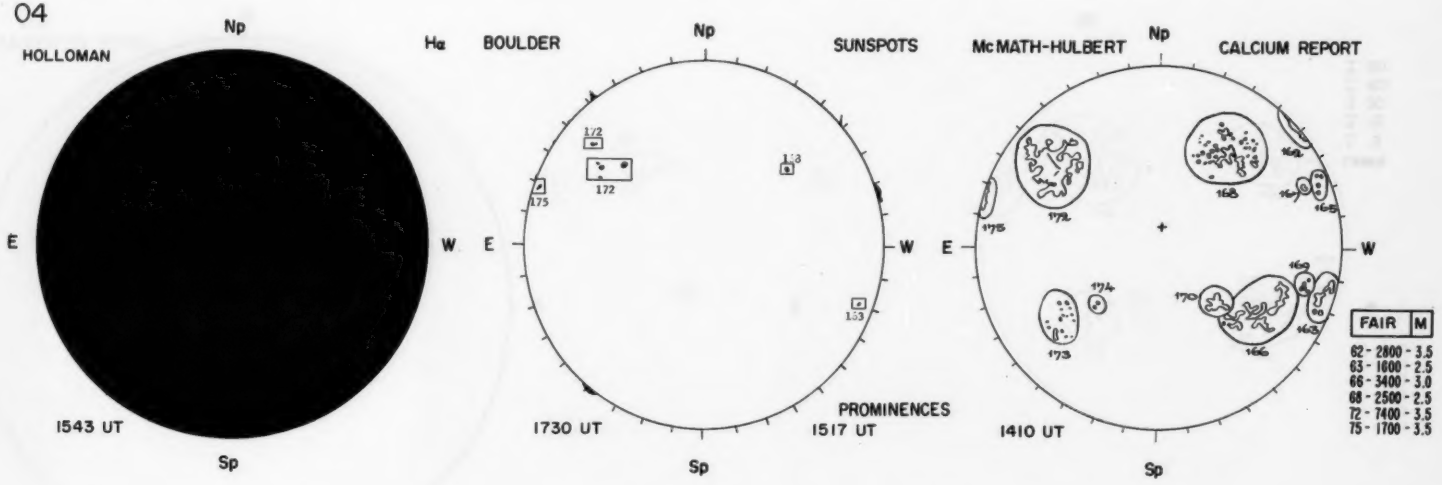
KITT PEAK — MAGNETOGRAM
Bright - Plus
Dark - Minus

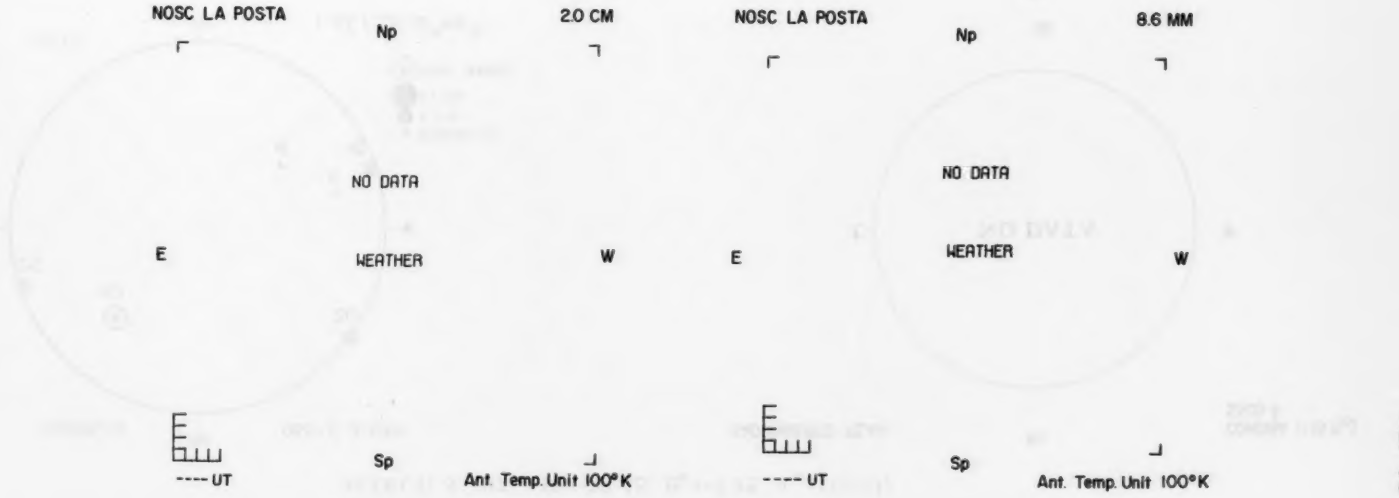


MT. WILSON — MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =

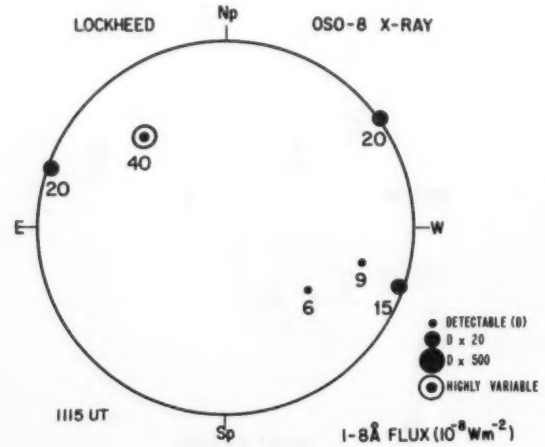
04


HOLLOMAN
Np
E
W
Sp
1543 UT
Hα
BOULDER
Np
SUNSPOTS
1/2
172
175
1.3
1.3
E
W
Sp
1730 UT
PROMINENCES
1517 UT
McMATH-HULBERT
Np
CALCIUM REPORT
E
W
Sp
1410 UT
FAIR M
62 - 2800 - 3.5
63 - 1600 - 2.5
66 - 3400 - 3.0
68 - 2500 - 2.5
72 - 7400 - 3.5
75 - 1700 - 3.5


NOSC LA POSTA
Np
2.0 CM
NO DATA
E
WEATHER
W
Sp
---- UT
Ant. Temp. Unit 100°K
NOSC LA POSTA
Np
8.6 MM
NO DATA
E
WEATHER
W
Sp
---- UT
Ant. Temp. Unit 100°K

MARCH 5, 1978 (P=-22.45, B_o=-7.25, L_o=110.71)

LOCKHEED OSO-8 X-RAY

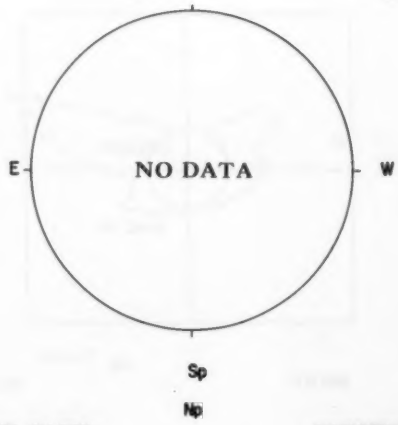


1115 UT

1-8Å FLUX (10^{-8} Wm^{-2})

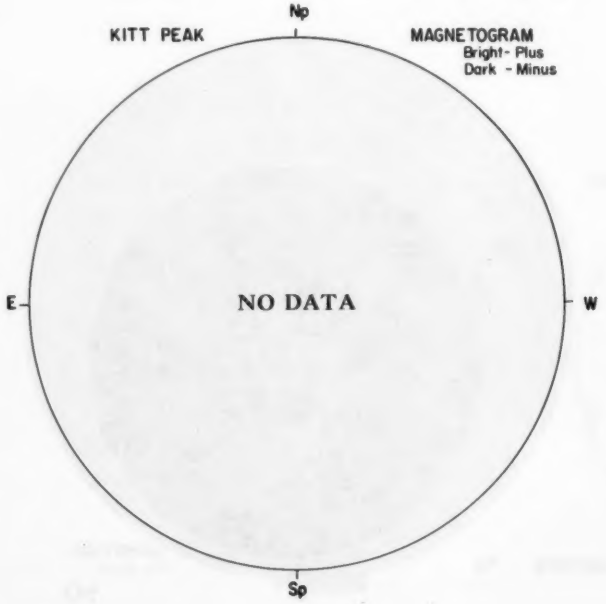
SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



KITT PEAK

MAGNETOGRAM
Bright - Plus
Dark - Minus



MT. WILSON

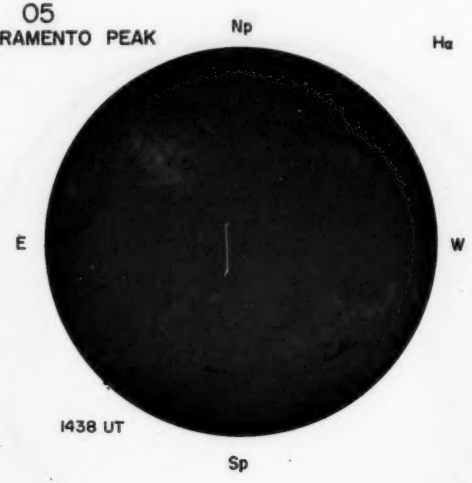
MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =

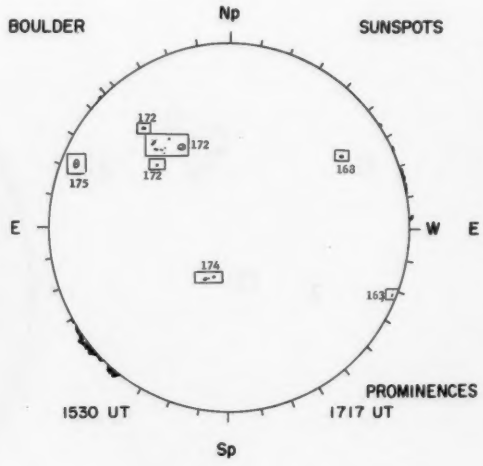
Levels
± 5
± 10
± 20
± 40
± 80

05

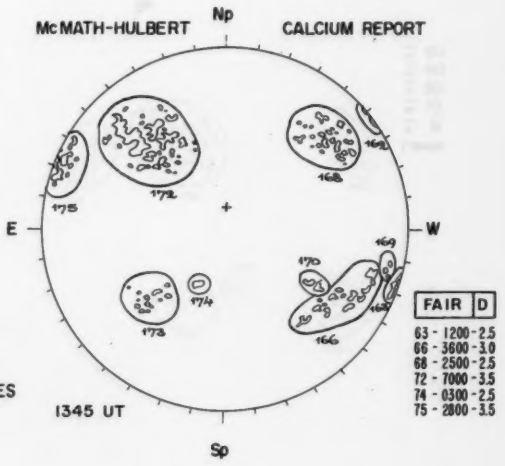
SACRAMENTO PEAK



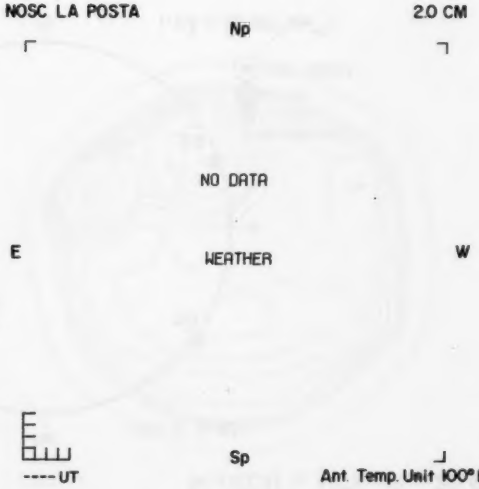
BOULDER



McMATH-HULBERT



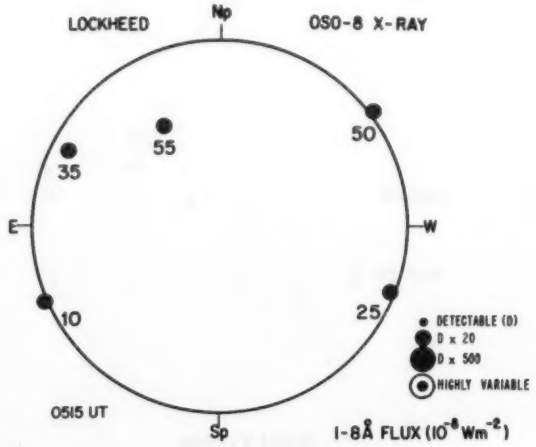
NOSC LA POSTA



NOSC LA POSTA

MARCH 6, 1978 (P=-22.68, B_0=-7.25, L_0=97.53)

LOCKHEED OSO-8 X-RAY



0515 UT

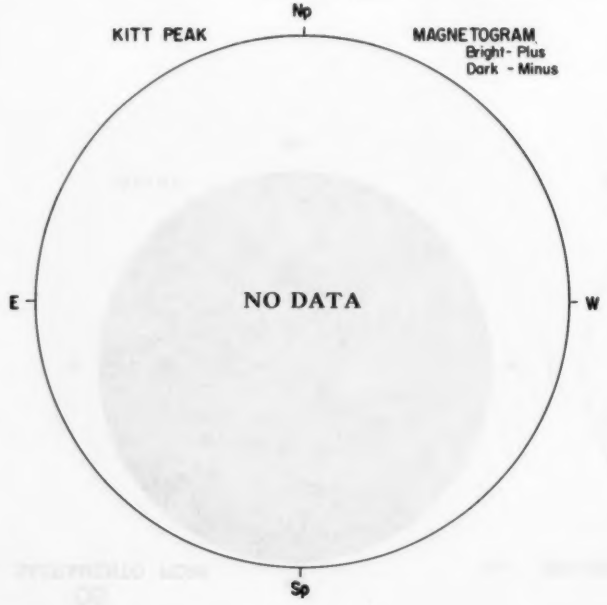
1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å

KITT PEAK

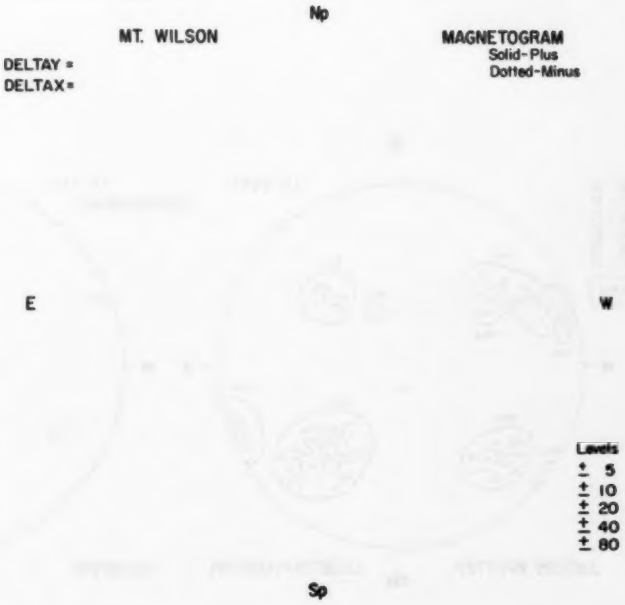
MAGNETOGRAM
Bright - Plus
Dark - Minus



MT. WILSON

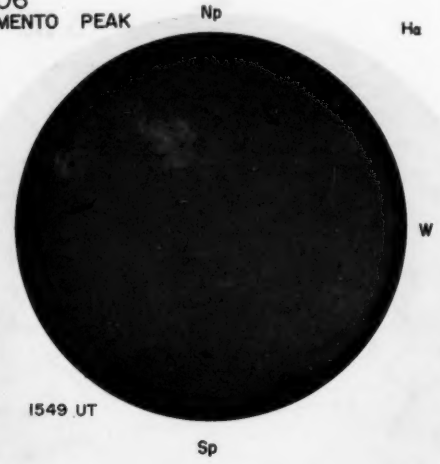
MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =



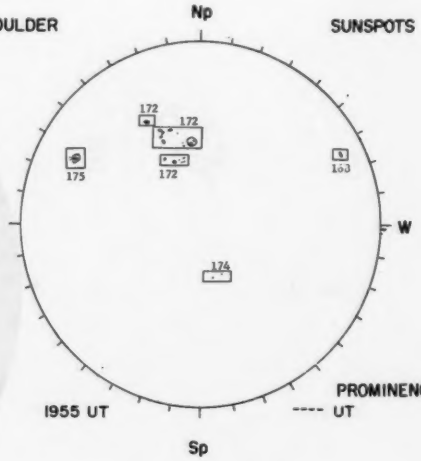
Levels
± 5
± 10
± 20
± 40
± 80

06
SACRAMENTO PEAK



1549 UT

Hα BOULDER



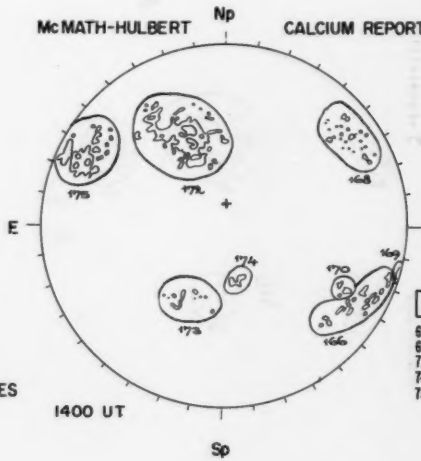
1955 UT

SUNSPOTS

PROMINENCES

---- UT

McMATH-HULBERT



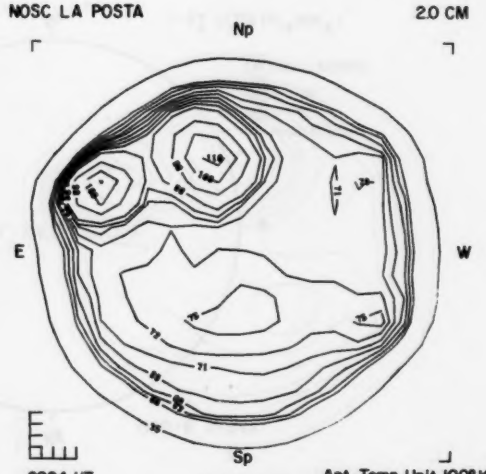
1400 UT

CALCIUM REPORT

FAIR | D

66 - 3200 - 2.5
68 - 2100 - 2.5
72 - 7000 - 4.5
74 - 0500 - 2.5
75 - 4500 - 3.5

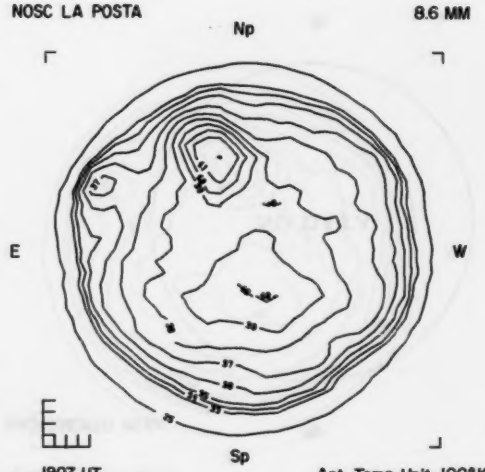
NOSC LA POSTA 2.0 CM



2004 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM



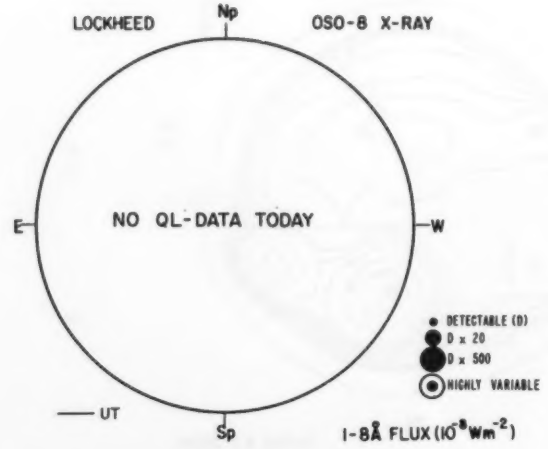
1907 UT

Ant. Temp. Unit 100°K

59
Mar 78

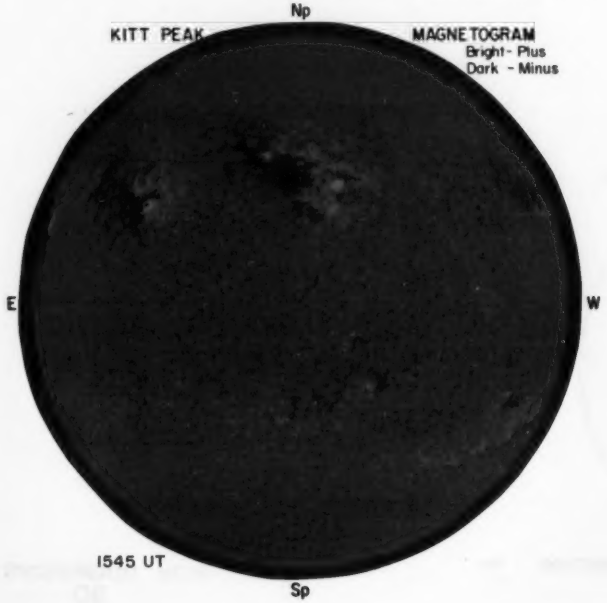
MARCH 7, 1978 (P=-22.90, B_o=-7.25, L_o=84.36)

LOCKHEED OSO-8 X-RAY



1-8Å FLUX (10^{-8} Wm^{-2})

KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



SACRAMENTO PEAK

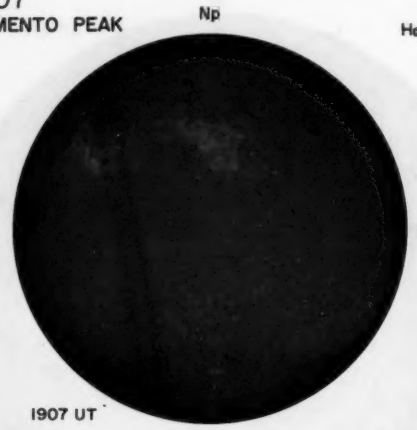
CORONA (1.15 $R_\odot$)
5303 Å

MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

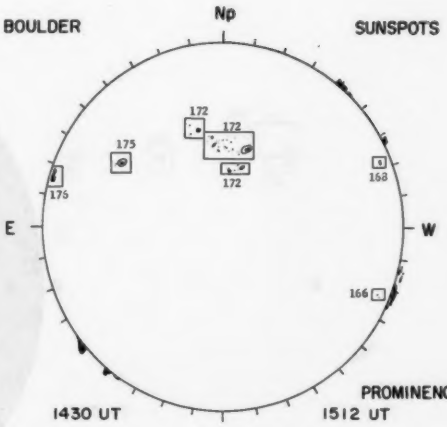
DELTAY =
DELTAX =

07

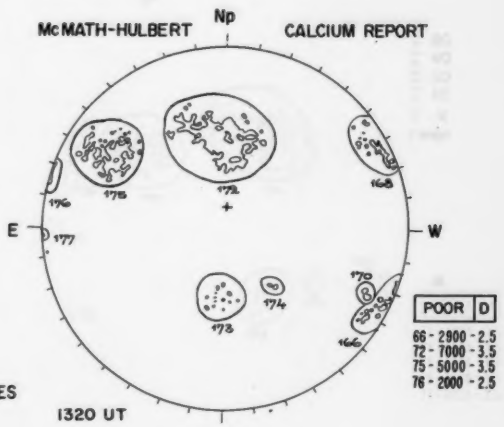
SACRAMENTO PEAK



Hα BOULDER



SUNSPOTS



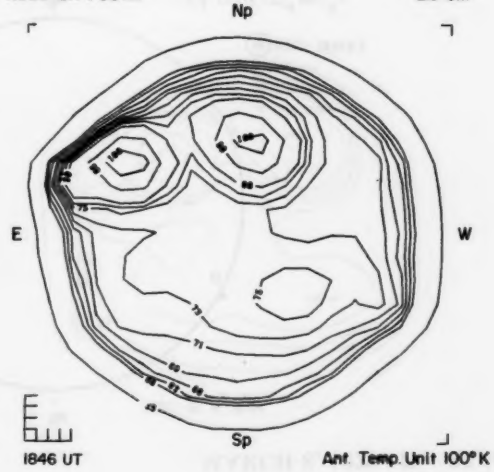
McMATH-HULBERT

CALCIUM REPORT

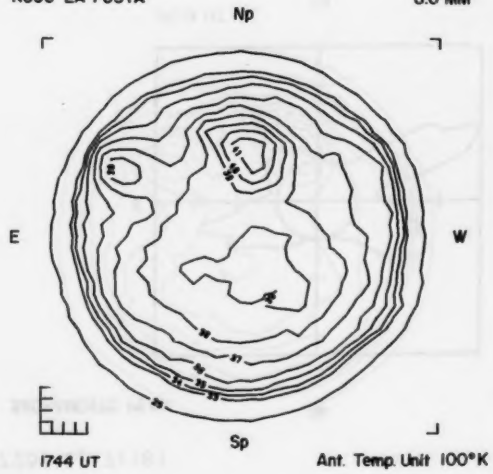
POOR	D

66 - 2900 - 2.5
72 - 7000 - 3.5
75 - 5000 - 3.5
76 - 2000 - 2.5

NOSC LA POSTA 2.0 CM

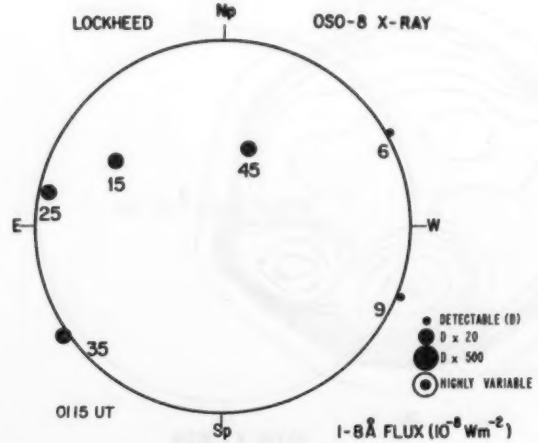


NOSC LA POSTA 8.6 MM



MARCH 8, 1978 (P = -23.11, B_o = -7.25, L_o = 71.18)

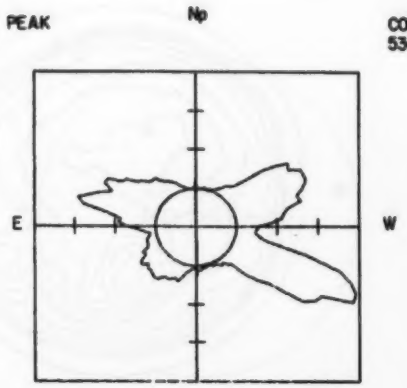
LOCKHEED — OSO-8 X-RAY



0115 UT

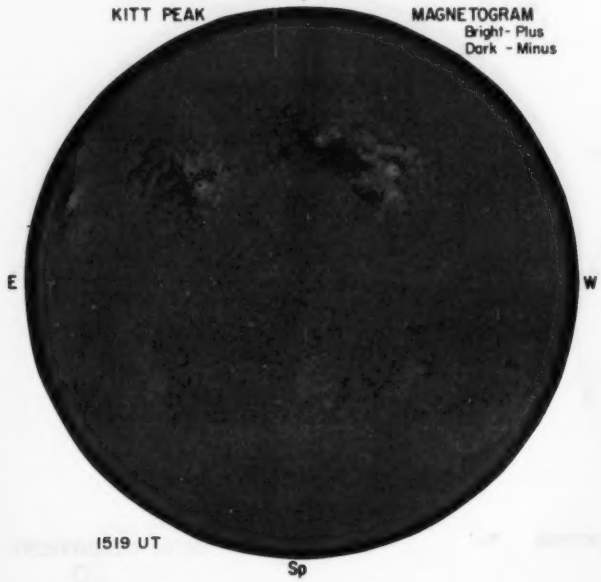
1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK — CORONA (1.15 $R_\odot$) 5303 Å



1528 UT

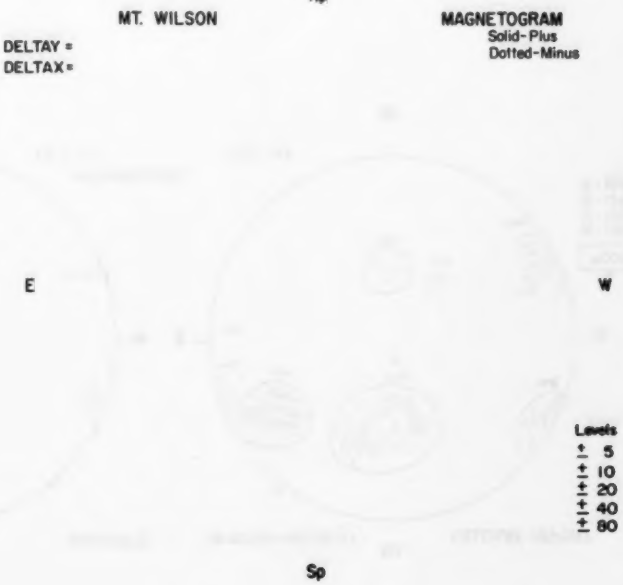
KITT PEAK — MAGNETOGRAM
Bright - Plus
Dark - Minus



1519 UT

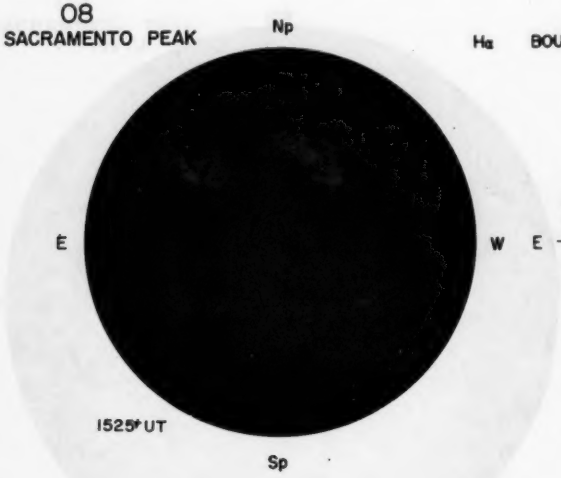
MT. WILSON — MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =



08

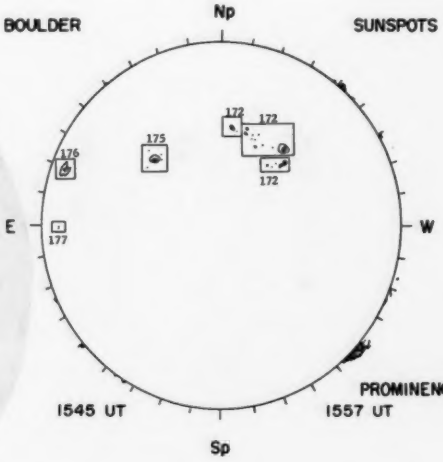
SACRAMENTO PEAK



1525 UT

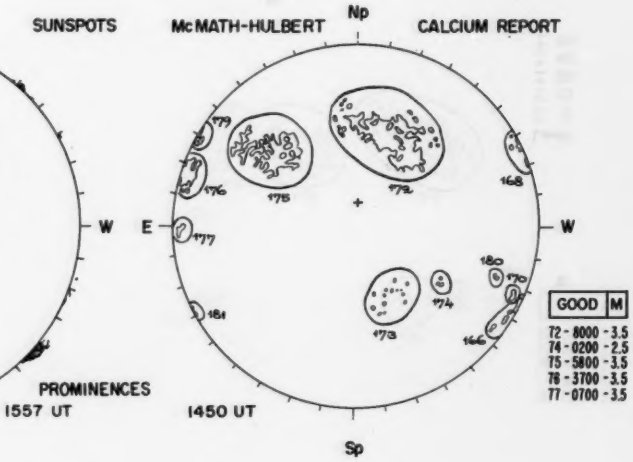
Hα

BOULDER



1545 UT

SUNSPOTS



1557 UT

McMATH-HULBERT

1450 UT

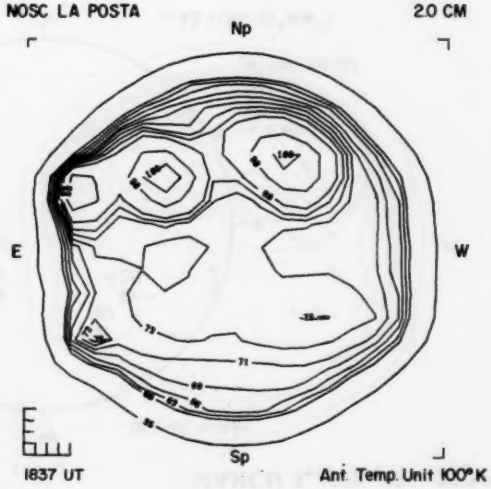
CALCIUM REPORT

GOOD	M
72 - 8000 - 3.5	
74 - 0200 - 2.5	
75 - 5800 - 3.5	
76 - 3700 - 3.5	
77 - 0700 - 3.5	

PROMINENCES

NOSC LA POSTA

2.0 CM

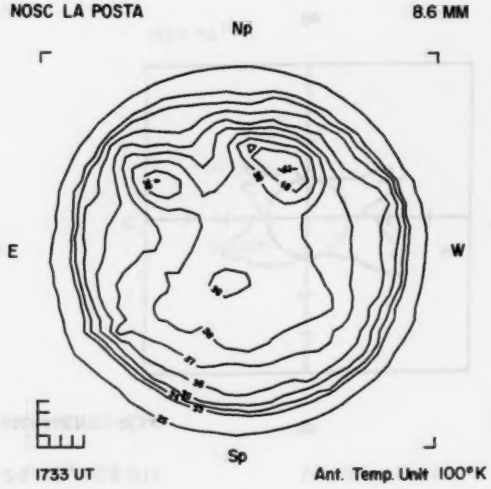


1837 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

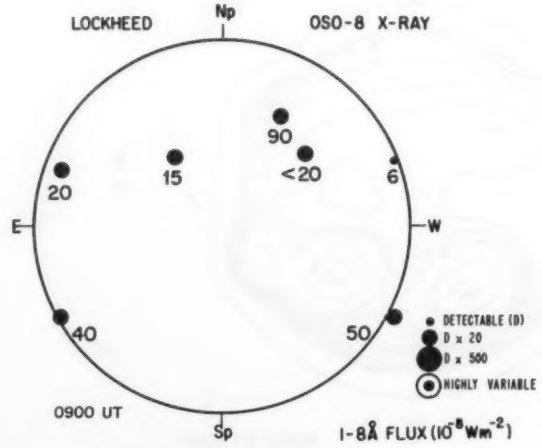


1733 UT

Ant. Temp. Unit 100°K

MARCH 9, 1978 (P=-23.32, B_o=-7.24, L_o=58.01)

LOCKHEED OSO-8 X-RAY

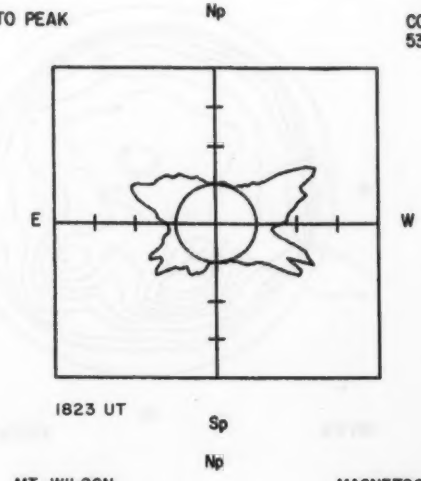


0900 UT

1-8Å FLUX (10^{-5} Wm^{-2})

SACRAMENTO PEAK

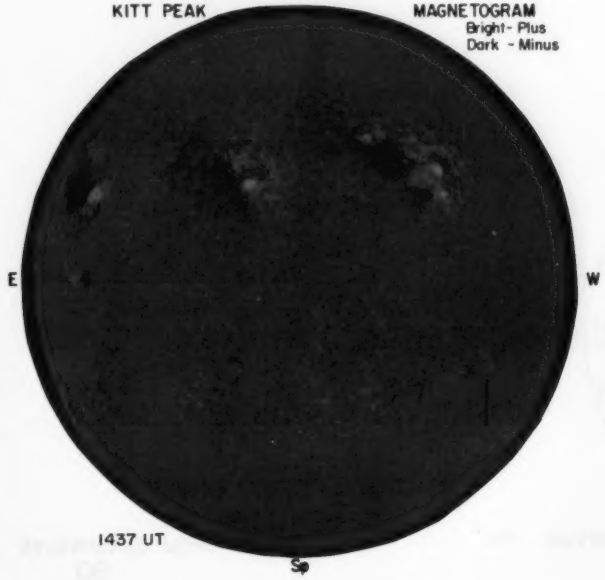
CORONA (1.15 $R_\odot$)
5303 Å



1823 UT

KITT PEAK

MAGNETOGRAM
Bright - Plus
Dark - Minus



1437 UT

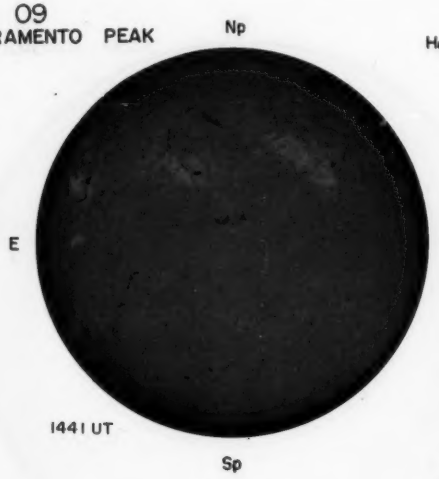
MT. WILSON

DELTAY =
DELTAX =

MAGNETOGRAM
Solid-Plus
Dotted-Minus

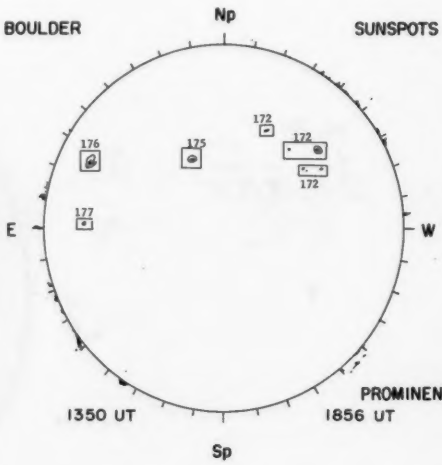
09

SACRAMENTO PEAK



1441 UT

Hα BOULDER



1350 UT

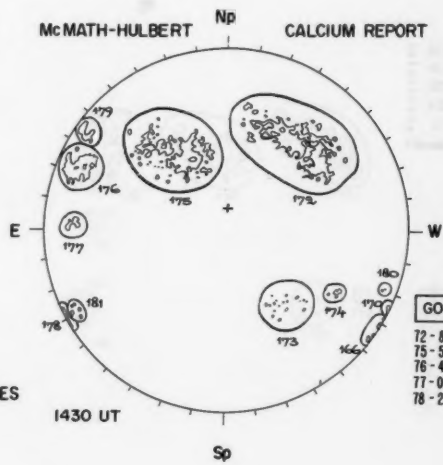
SUNSPOTS

PROMINENCES

1856 UT

McMATH-HULBERT

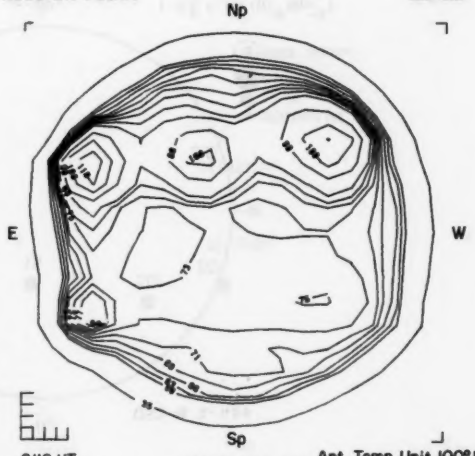
CALCIUM REPORT



1430 UT

GOOD	M
72 - 8000 - 3.0	
75 - 5800 - 3.5	
76 - 4600 - 3.5	
77 - 0800 - 3.5	
78 - 2500 - 3.5	

NOSC LA POSTA 2.0 CM



2118 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM

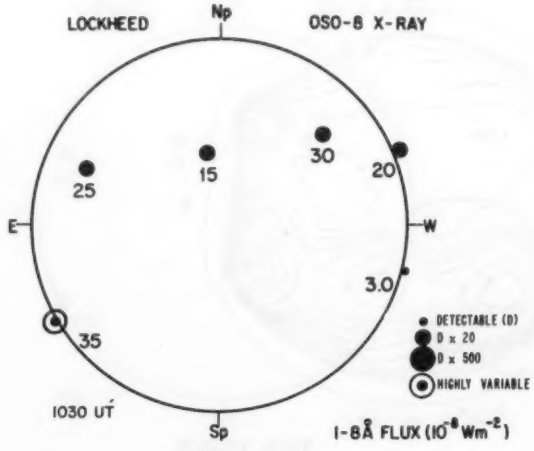
1733 UT

Ant. Temp. Unit 100°K

65
Mar 78

MARCH 10, 1978 (P=-23.52, B_o=-7.24, L_o=44.83)

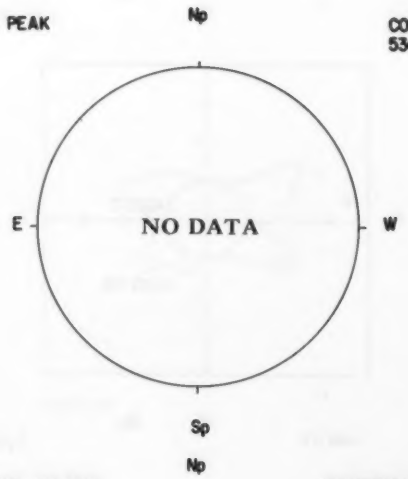
LOCKHEED OSO-8 X-RAY



1-8Å FLUX (10^{-8} Wm^{-2})

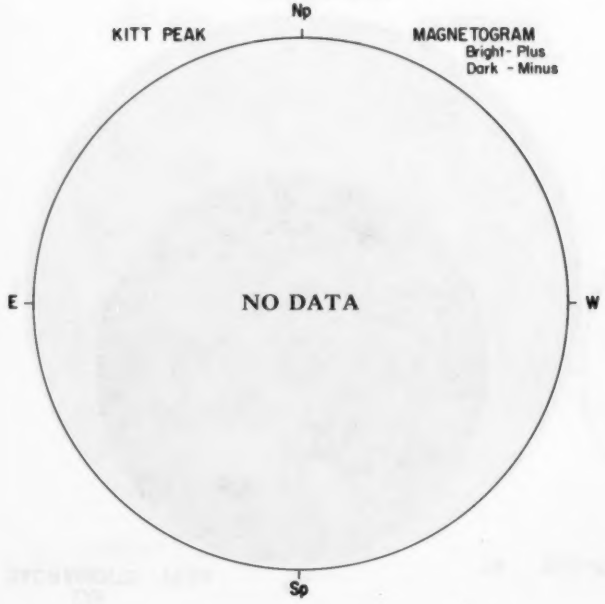
SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



KITT PEAK

MAGNETOGRAM
Bright - Plus
Dark - Minus



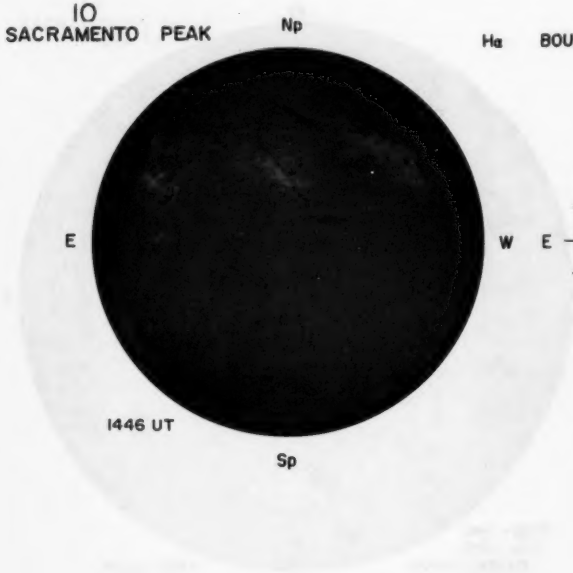
MT. WILSON

DELTAY =
DELTAX =

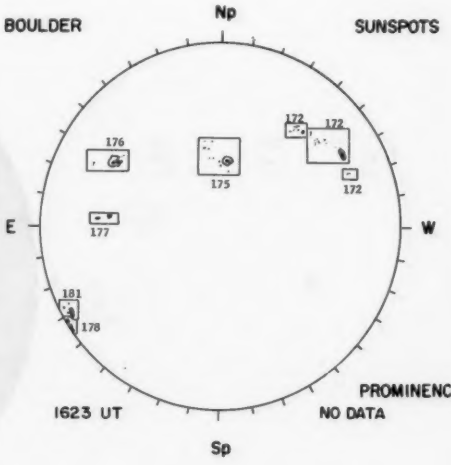
MAGNETOGRAM
Solid - Plus
Dotted - Minus

10

SACRAMENTO PEAK



Hα BOULDER



1623 UT

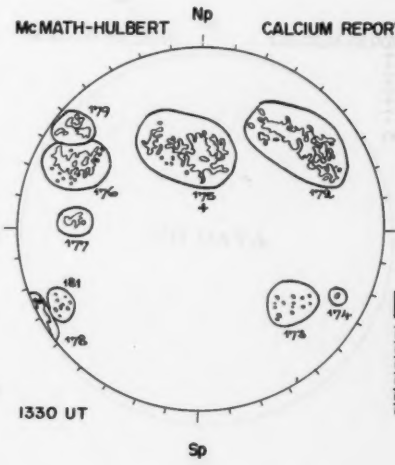
SUNSPOTS

PROMINENCES

NO DATA

McMATH-HULBERT

CALCIUM REPORT



1330 UT

FAIR	S
72 - 7800 - 3.5	
75 - 6000 - 3.0	
76 - 5200 - 3.5	
77 - 0800 - 3.0	
78 - 3000 - 3.5	
79 - 1500 - 2.5	

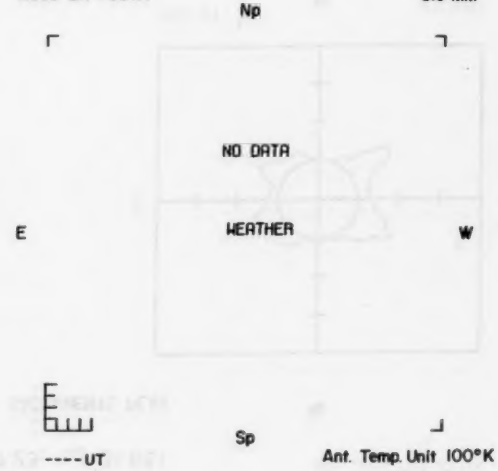
NOSC LA POSTA

2.0 CM

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

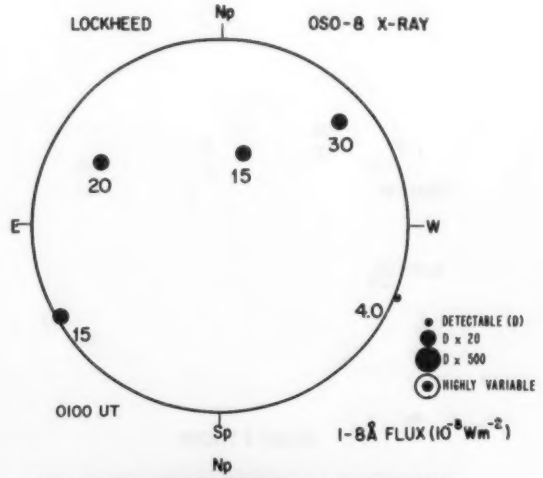


Ant. Temp. Unit 100°K

67
Mar 78

MARCH 11, 1978 (P =-23.71, B_0 =-7.23, L_0 =31.65)

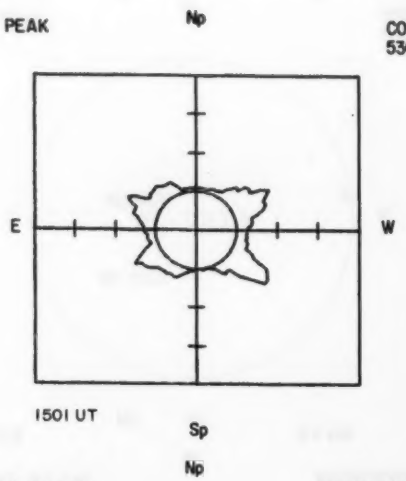
LOCKHEED



OSO-8 X-RAY

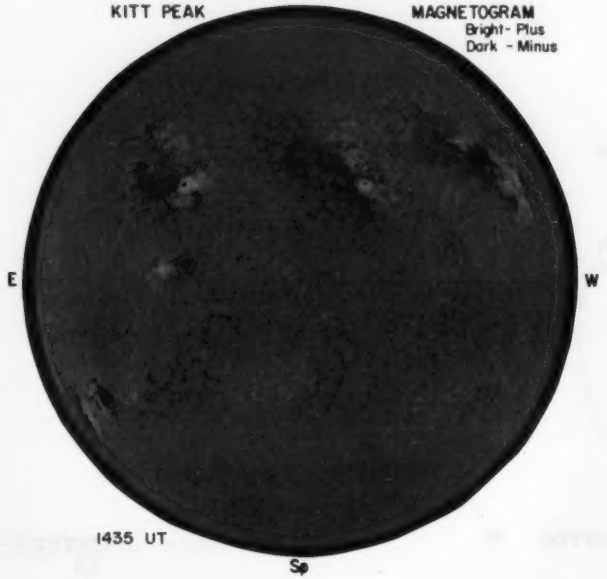
I-8Å FLUX (10^{-3} Wm^{-2})

SACRAMENTO PEAK



CORONA (1.15 $R_\odot$)
5303 Å

KITT PEAK



MAGNETOGRAM
Bright- Plus
Dark - Minus

MT. WILSON

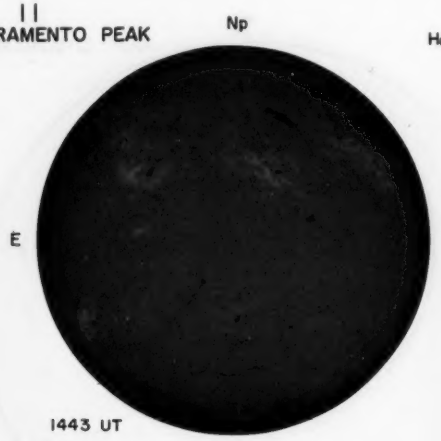
DELTAY =
DELTAX =

MAGNETOGRAM
Solid-Plus
Dotted-Minus

Levels
± 5
± 10
± 20
± 40
± 80

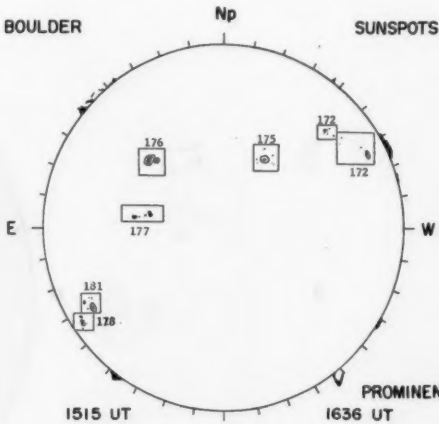
Sp

SACRAMENTO PEAK



1443 UT

Hα BOULDER



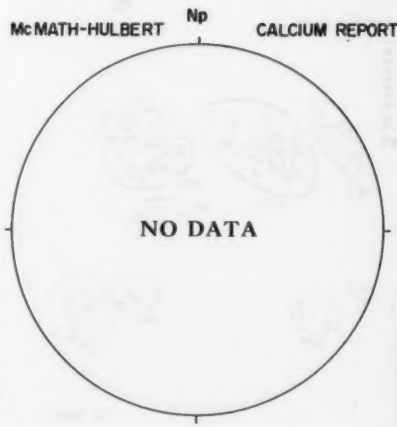
1515 UT

SUNSPOTS

PROMINENCES

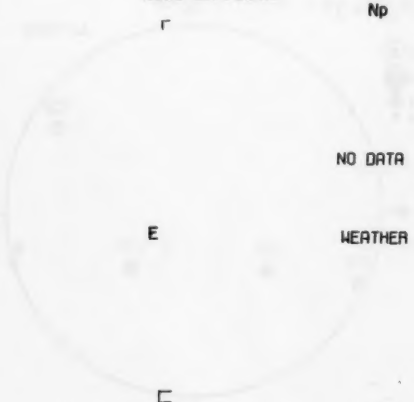
1636 UT

McMATH-HULBERT



CALCIUM REPORT

NOSC LA POSTA

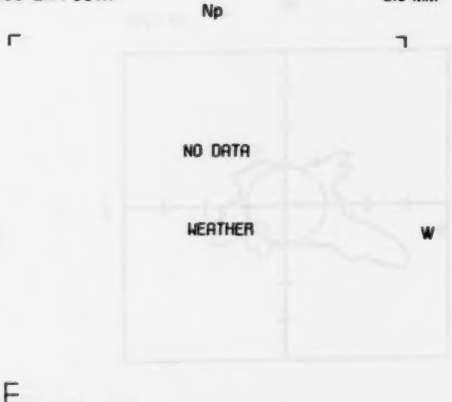


2.0 CM

Ant. Temp. Unit 100°K

----UT

NOSC LA POSTA



8.6 MM

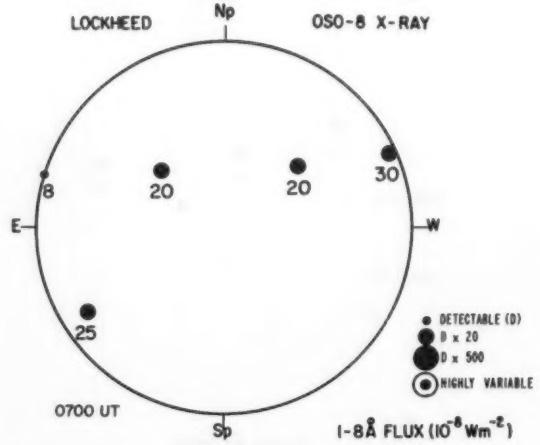
Ant. Temp. Unit 100°K

----UT

69
Mar 78

MARCH 12, 1978 (P=-23.90, B_o=-7.22, L_o=18.47)

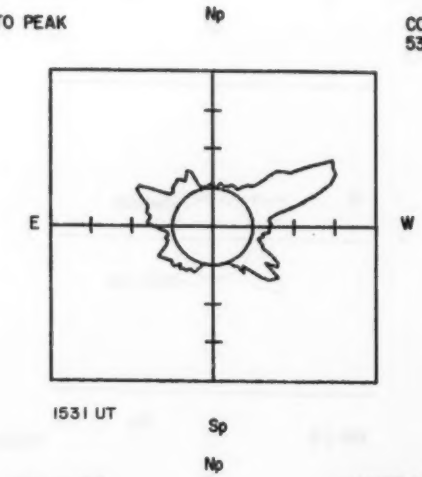
LOCKHEED



OSO-8 X-RAY

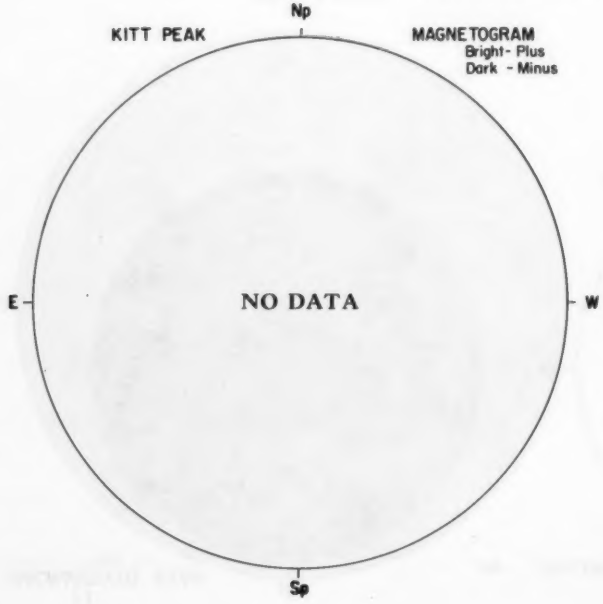
1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK



CORONA (1.15 $R_\odot$)
5303 Å

KITT PEAK



MAGNETOGRAM
Bright - Plus
Dark - Minus

MT. WILSON

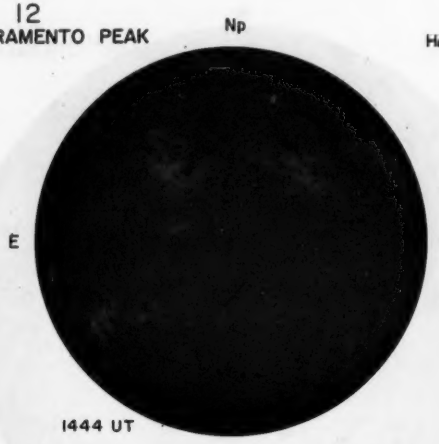
DELTAY =
DELTAX =

MAGNETOGRAM
Solid - Plus
Dotted - Minus

Levels
± 5
± 10
± 20
± 40
± 80

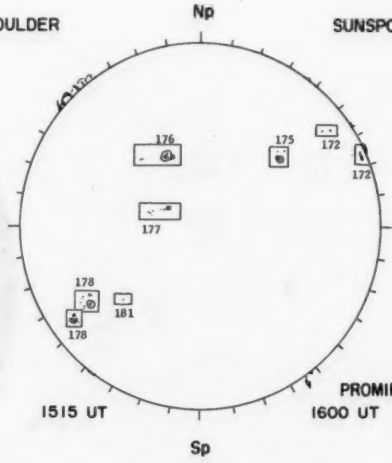
12

SACRAMENTO PEAK



1444 UT

Hα BOULDER



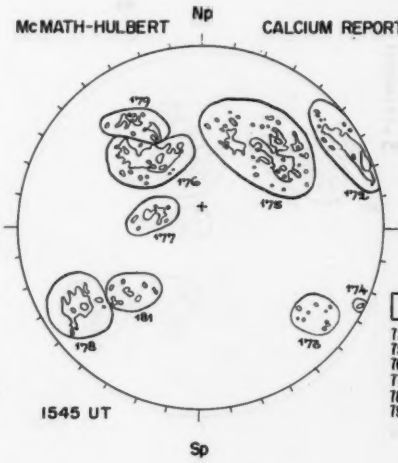
1515 UT

SUNSPOTS

PROMINENCES

1600 UT

McMATH-HULBERT



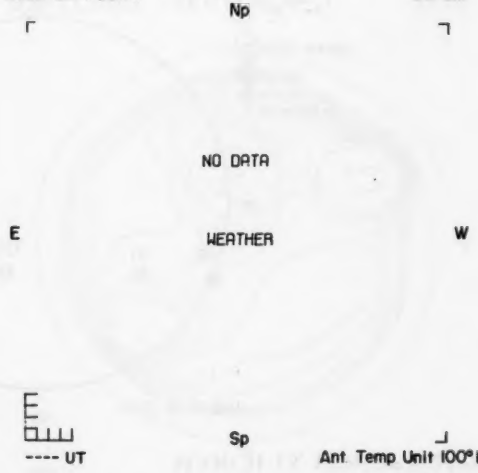
1545 UT

CALCIUM REPORT

FAIR	S

72 - 7500 - 3.0
75 - 6000 - 3.0
76 - 5500 - 3.0
77 - 1100 - 2.5
78 - 4500 - 3.0
79 - 1700 - 2.5

NOSC LA POSTA

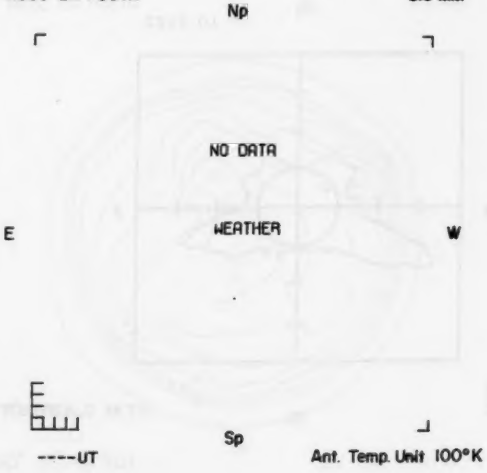


---- UT

2.0 CM

Ant. Temp Unit 100°K

NOSC LA POSTA



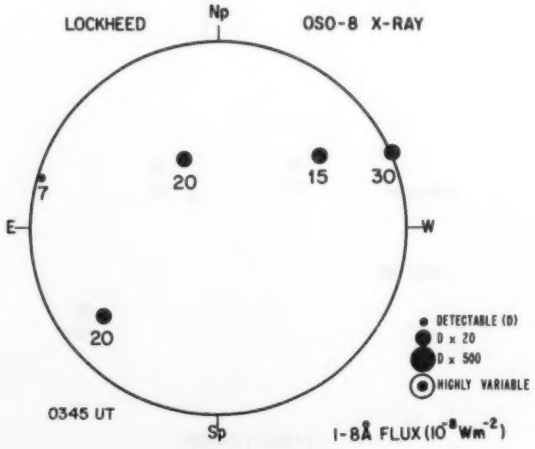
----UT

8.6 MM

Ant. Temp. Unit 100°K

MARCH 13, 1978 (P=-24.08, B_o=-7.20, L_o=5.30)

LOCKHEED OSO-8 X-RAY

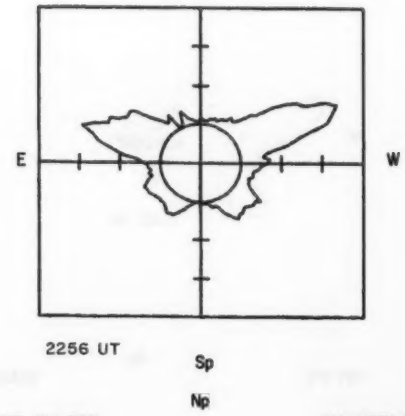


0345 UT

1-8Å FLUX (10^{-8} Wm^{-2})

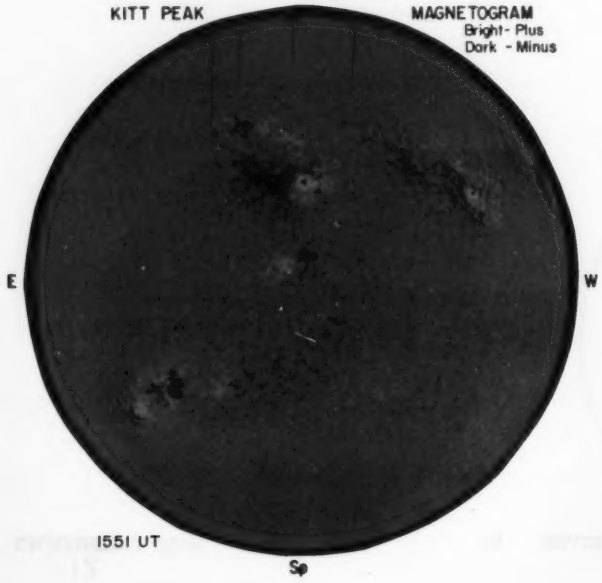
SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



2256 UT

KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



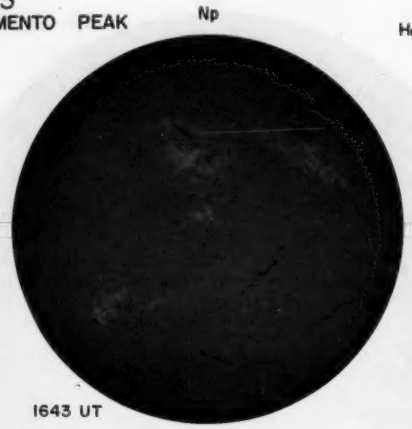
1551 UT

MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =

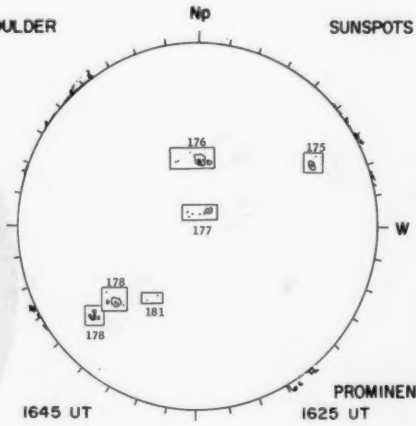
13

SACRAMENTO PEAK



1643 UT

Hα BOULDER



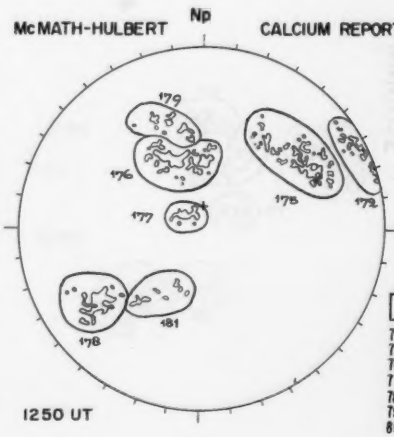
1645 UT

SUNSPOTS

PROMINENCES

1625 UT

McMATH-HULBERT



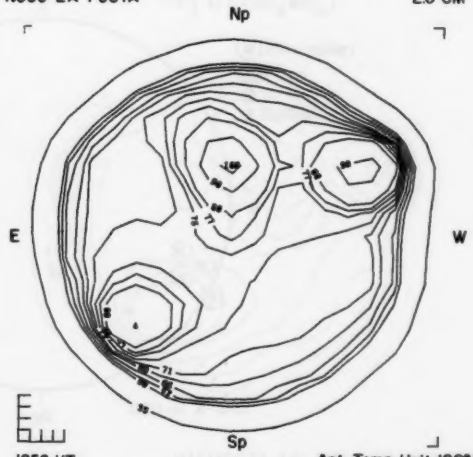
1250 UT

CALCIUM REPORT

FAIR	D

72 - 3200 - 2.0
75 - 5300 - 2.5
76 - 4800 - 3.0
77 - 1300 - 2.5
78 - 4600 - 3.0
79 - 1400 - 2.5
81 - 1100 - 2.5

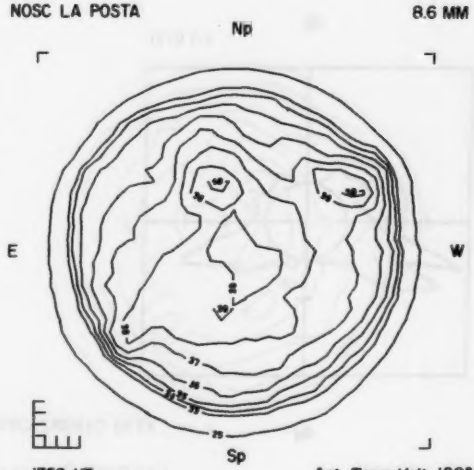
NOSC LA POSTA 2.0 CM



1856 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM



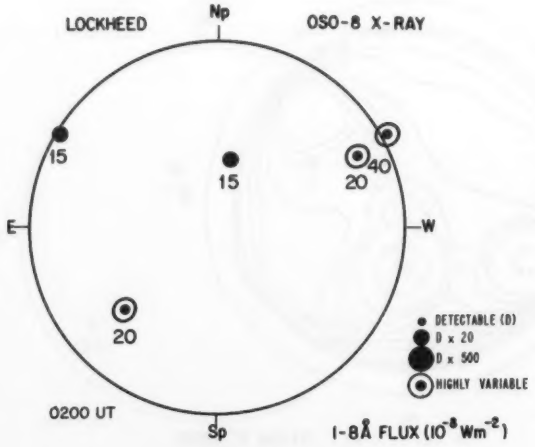
1759 UT

Ant. Temp. Unit 100°K

73
Mar 78

MARCH 14, 1978 (P = -24.25, B_0 = -7.19, L_0 = 352.12)

LOCKHEED

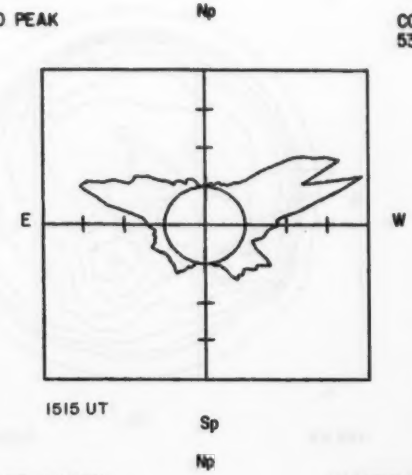


OSO-8 X-RAY

0200 UT

1-8Å FLUX (10^{-8} Wm^{-2})

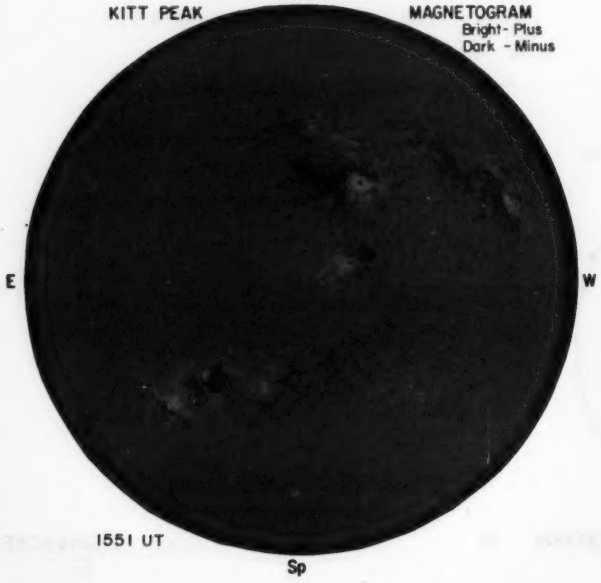
SACRAMENTO PEAK



CORONA (1.15 $R_\odot$)
5303 Å

1515 UT

KITT PEAK



MAGNETOGRAM
Bright - Plus
Dark - Minus

1551 UT

MT. WILSON

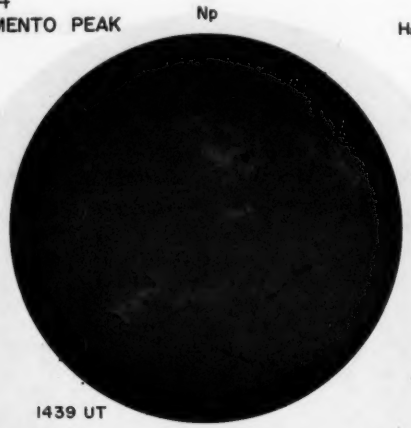
DELTAY =
DELTAX =

MAGNETOGRAM
Solid - Plus
Dotted - Minus

Levels
± 5
± 10
± 20
± 40
± 80

14

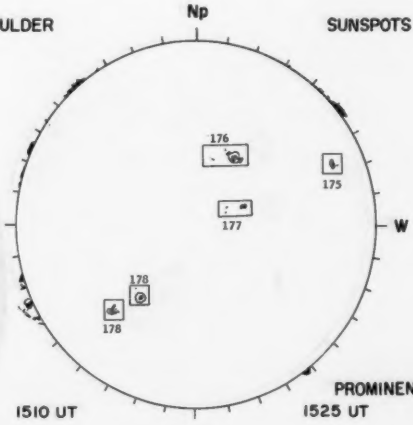
SACRAMENTO PEAK



1439 UT

Hα

BOULDER



1510 UT

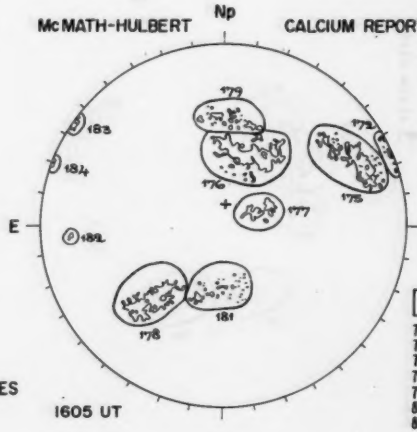
SUNSPOTS

PROMINENCES

1525 UT

McMATH-HULBERT

CALCIUM REPORT



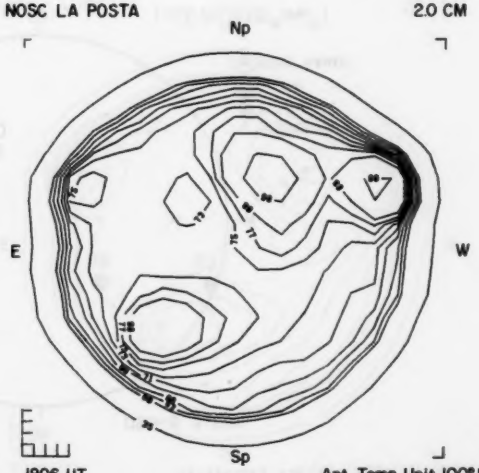
1605 UT

GOOD	M

75 - 5500 - 2.5
76 - 5200 - 3.5
77 - 1200 - 2.5
78 - 4600 - 3.0
79 - 1300 - 2.5
83 - 1200 - 3.5
84 - 0600 - 4.0

NOSC LA POSTA

2.0 CM

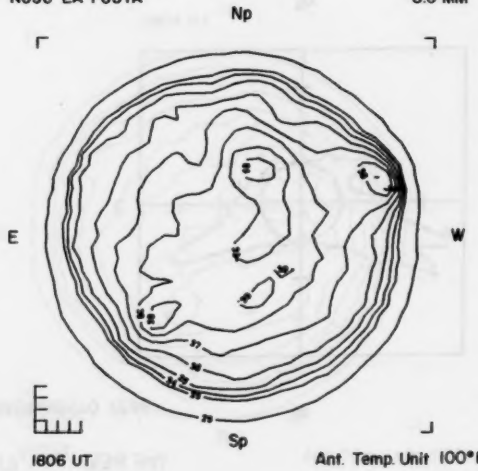


1906 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM



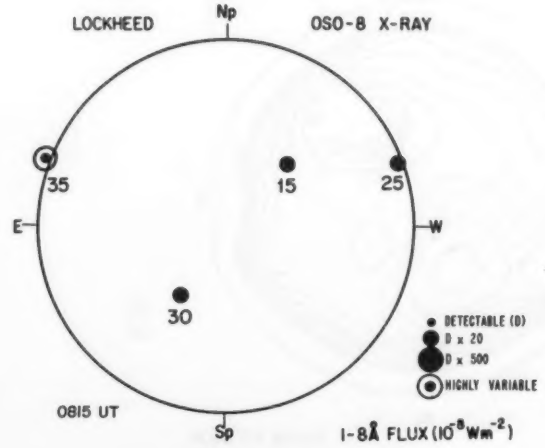
1806 UT

Ant. Temp. Unit 100°K

75
Mar 78

MARCH 15, 1978 (P = -24.42, B_o = -7.17, L_o = 338.94)

LOCKHEED OSO-8 X-RAY

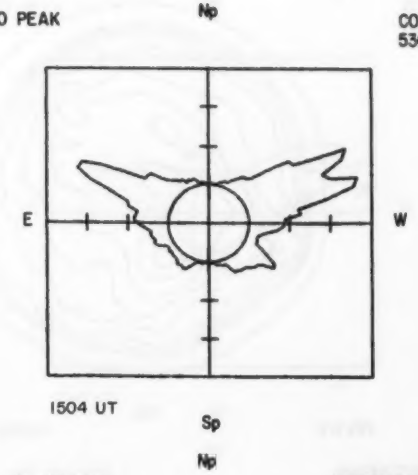


0815 UT

1-8Å FLUX (10^{-3} Wm^{-2})

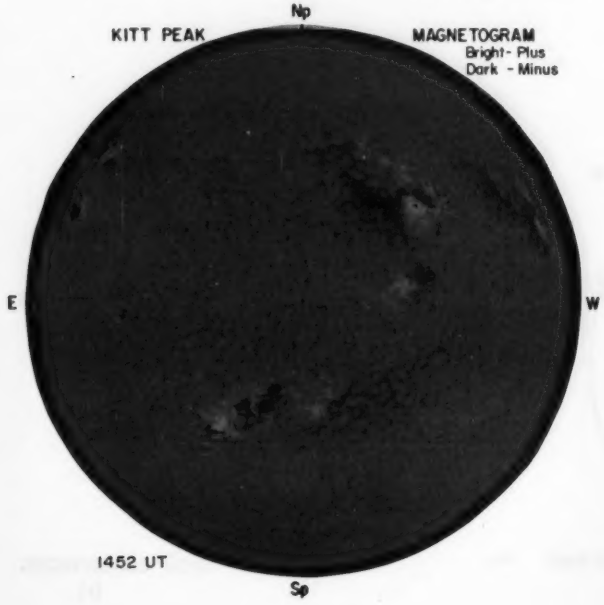
SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



1504 UT

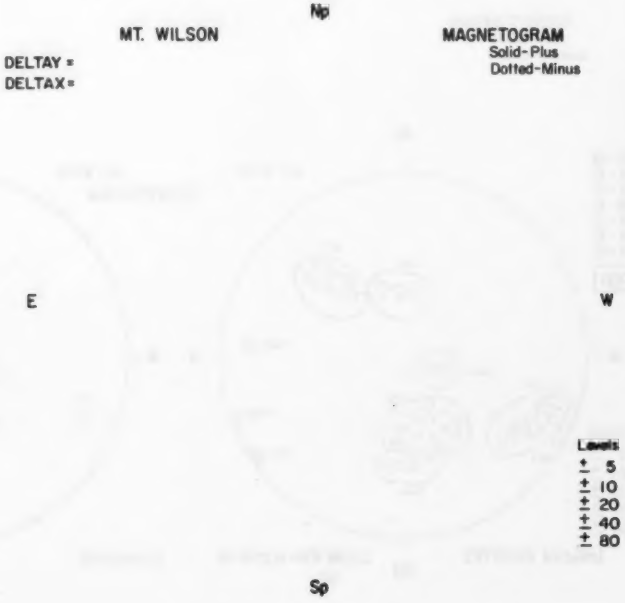
KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1452 UT

MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

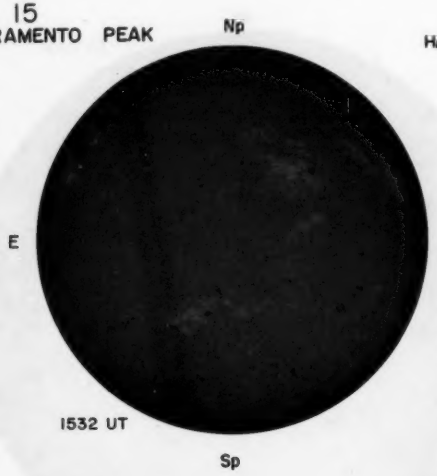
DELTAY =
DELTAX =



Levels:
± 5
± 10
± 20
± 40
± 80

15

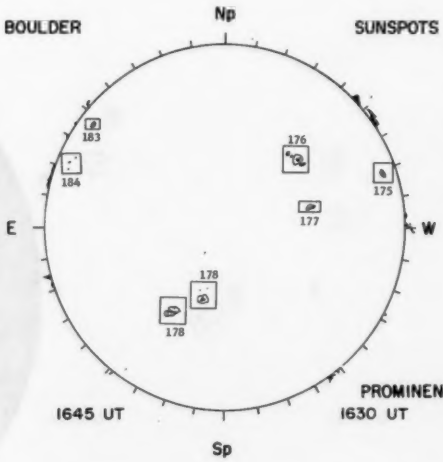
SACRAMENTO PEAK



1532 UT

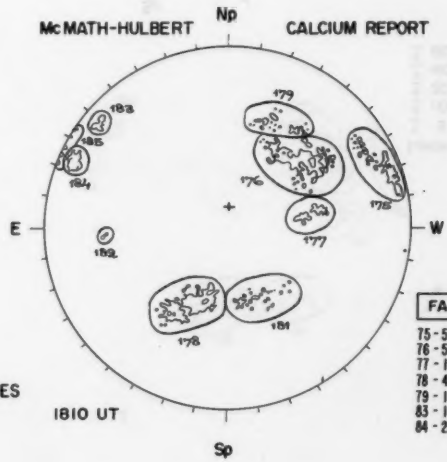
Hα

BOULDER



1645 UT

SUNSPOTS



1810 UT

McMATH-HULBERT

CALCIUM REPORT

FAIR	M

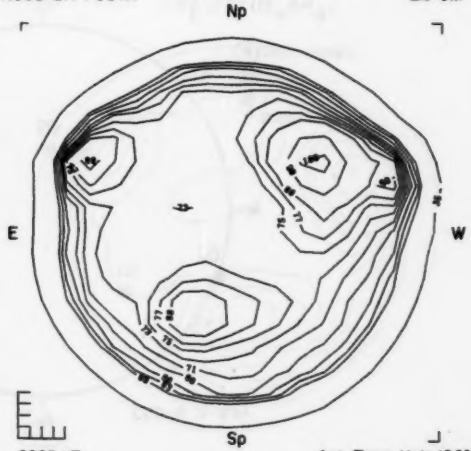
75 - 5500 - 2.5
76 - 5100 - 3.0
77 - 1200 - 3.0
78 - 4600 - 3.5
79 - 1000 - 2.5
83 - 1700 - 3.5
84 - 2500 - 3.0

PROMINENCES

1630 UT

NOSC LA POSTA

2.0 CM

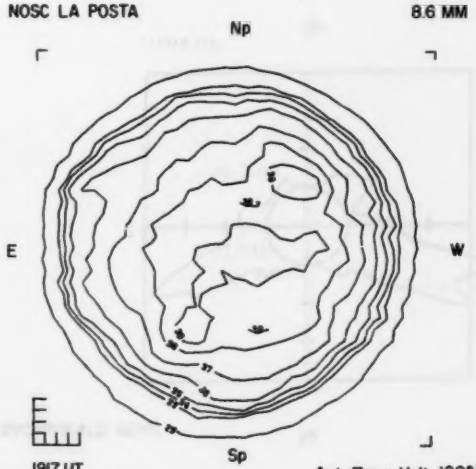


2025 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM



1917 UT

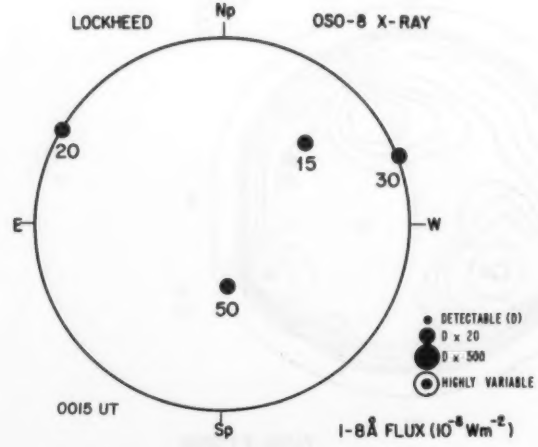
Ant. Temp. Unit 100°K

77
Mar 78

MARCH 16, 1978 (P = -24.58, B_o = -7.15, L_o = 325.76)

LOCKHEED

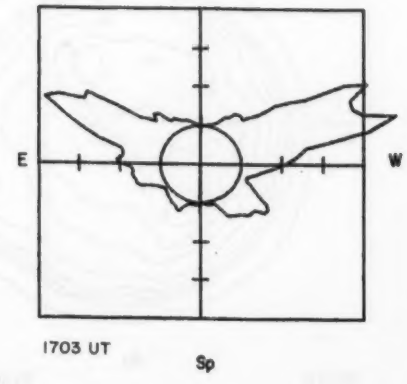
OSO-8 X-RAY



I-8Å FLUX (10^{-8} Wm^{-2})

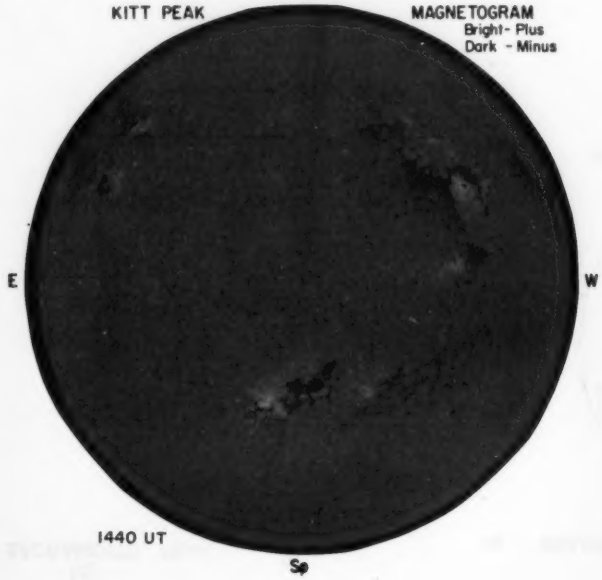
SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



KITT PEAK

MAGNETOGRAM
Bright - Plus
Dark - Minus



MT. WILSON

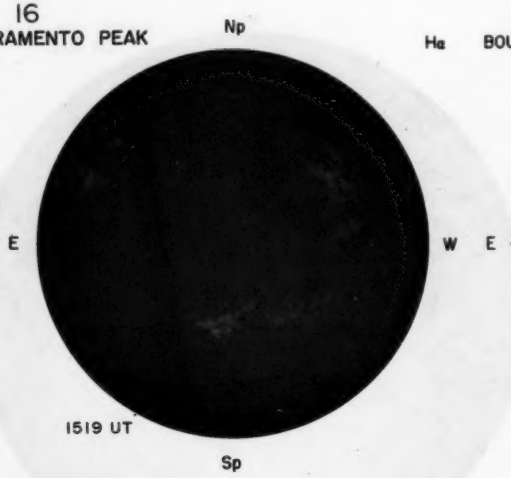
MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =

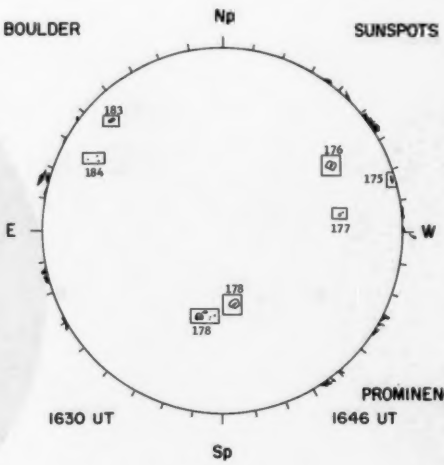
Levels
± 5
± 10
± 20
± 40
± 80

16

SACRAMENTO PEAK



BOULDER



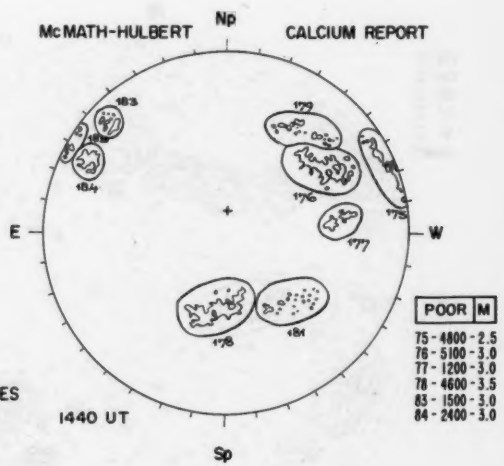
SUNSPOTS

PROMINENCES

1646 UT

McMATH-HULBERT

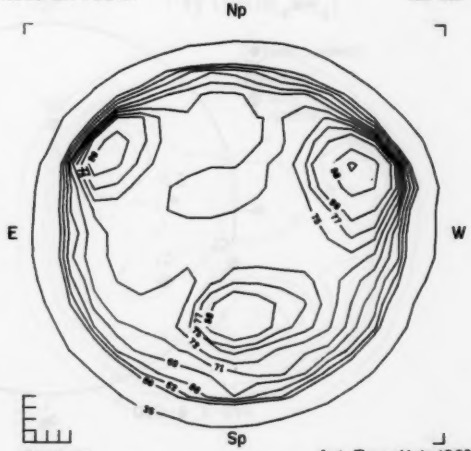
CALCIUM REPORT



POOR	M
75 - 4800 - 2.5	
76 - 5100 - 3.0	
77 - 1200 - 3.0	
78 - 4600 - 3.5	
83 - 1500 - 3.0	
84 - 2400 - 3.0	

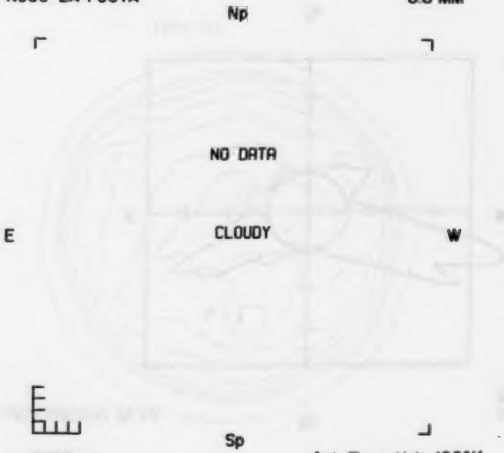
NOSC LA POSTA

2.0 CM



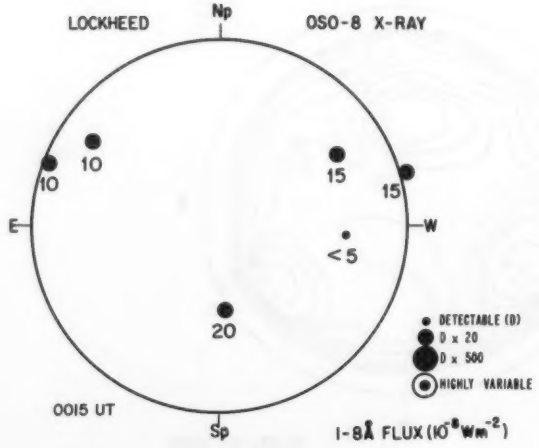
NOSC LA POSTA

8.6 MM



MARCH 17, 1978 (P=-24.73, B_o=-7.13, L_o=312.57)

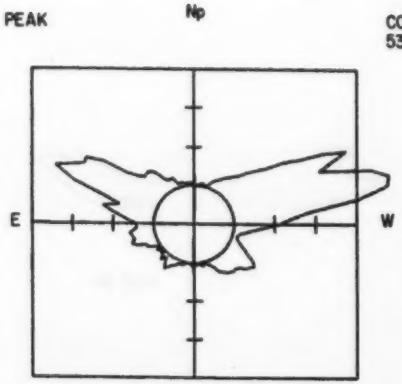
LOCKHEED OSO-8 X-RAY



0015 UT

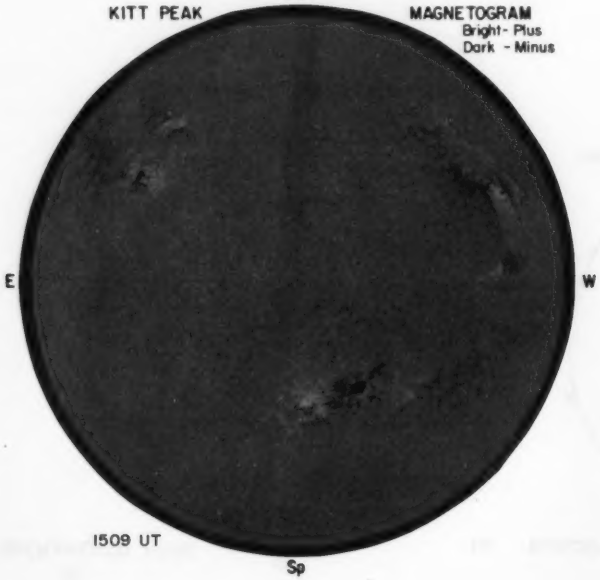
1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK



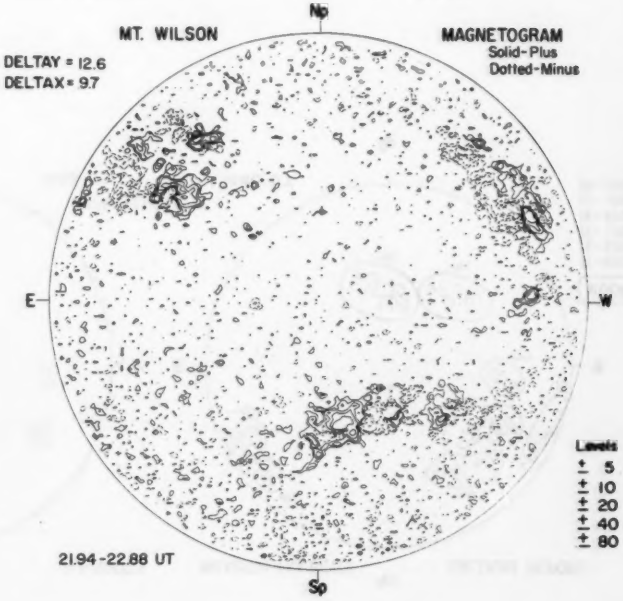
1805 UT

KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1509 UT

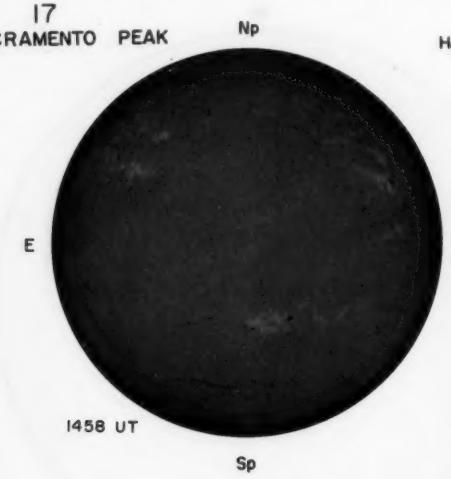
MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus
DELTAY = 12.6
DELTAX = 9.7



21.94-22.88 UT

17

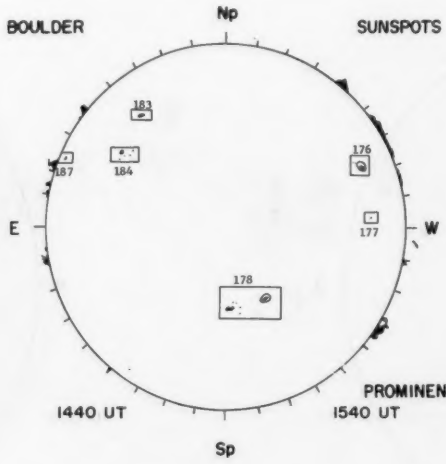
SACRAMENTO PEAK



1458 UT

Hα

BOULDER



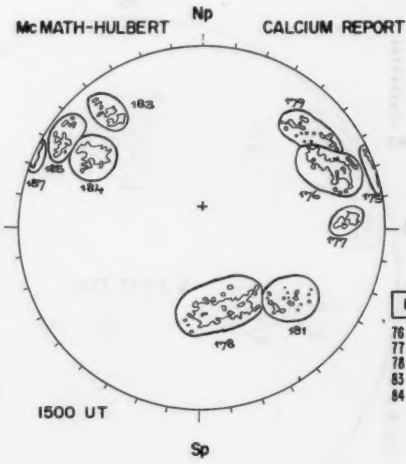
1440 UT

SUNSPOTS

PROMINENCES

1540 UT

McMATH-HULBERT



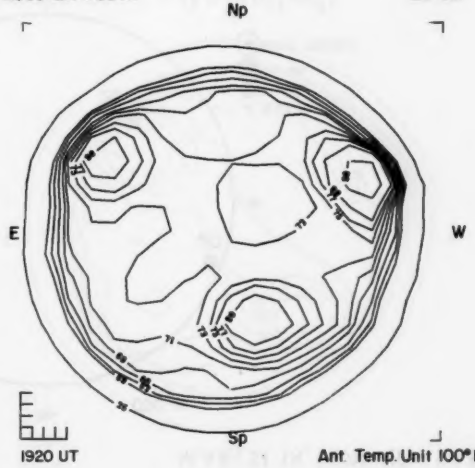
1500 UT

CALCIUM REPORT

FAIR	M
76 - 5100 - 3.5	
77 - 1100 - 3.0	
78 - 5000 - 3.0	
83 - 1500 - 3.5	
84 - 2700 - 3.0	

NOSC LA POSTA

2.0 CM

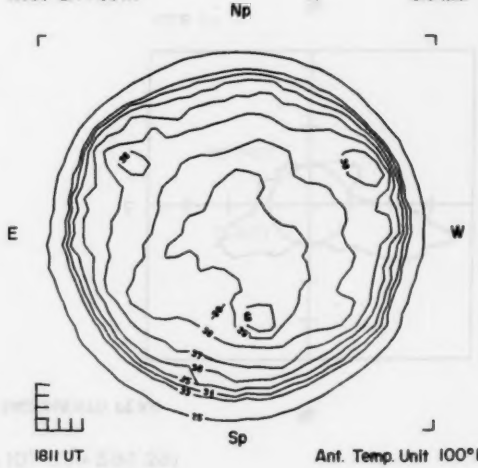


1920 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM



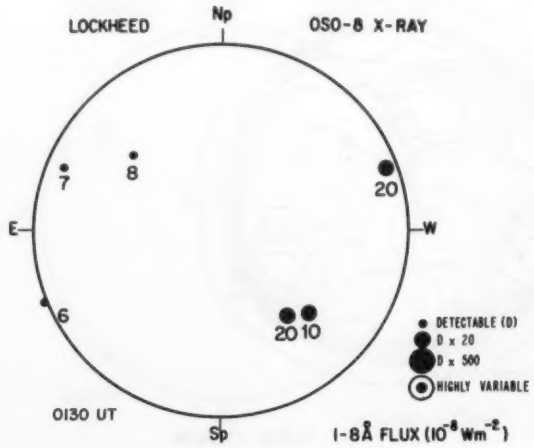
1811 UT

Ant. Temp. Unit 100°K

MARCH 18, 1978 (P =-24.87, B_o =-7.10, L_o = 299.39)

LOCKHEED

OSO-8 X-RAY

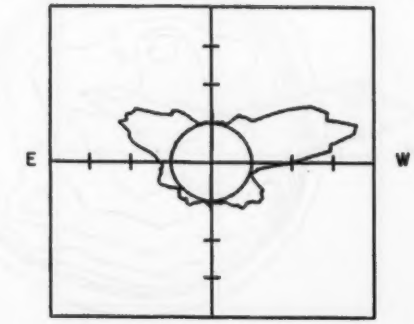


0130 UT

1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK

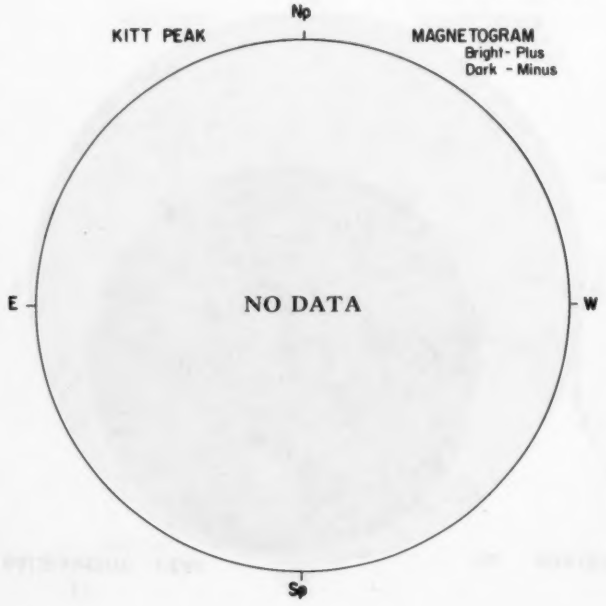
CORONA (1.15 $R_\odot$)
5303 Å



1828 UT

KITT PEAK

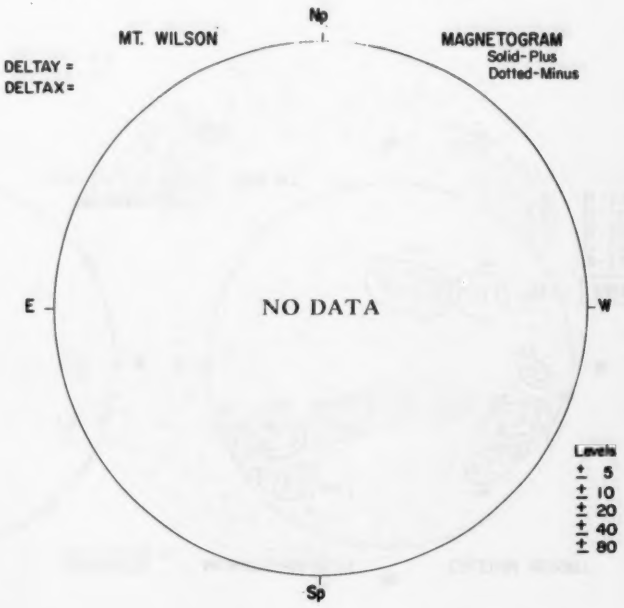
MAGNETOGRAM
Bright- Plus
Dark - Minus



MT. WILSON

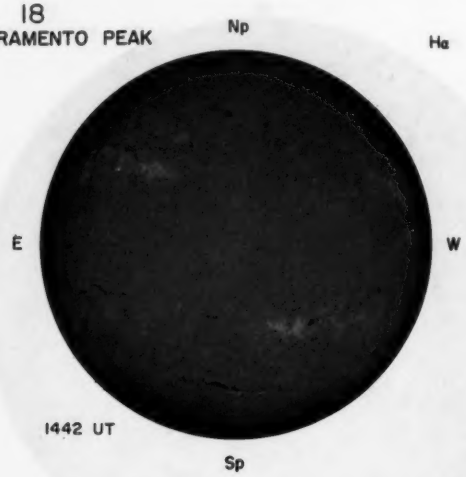
DELTAY =
DELTAX =

MAGNETOGRAM
Solid- Plus
Dotted- Minus



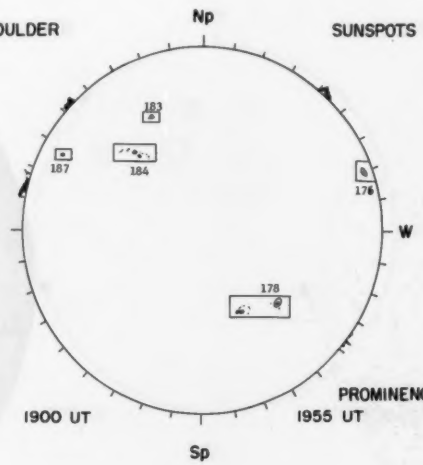
18

SACRAMENTO PEAK



1442 UT

Hα BOULDER



1900 UT

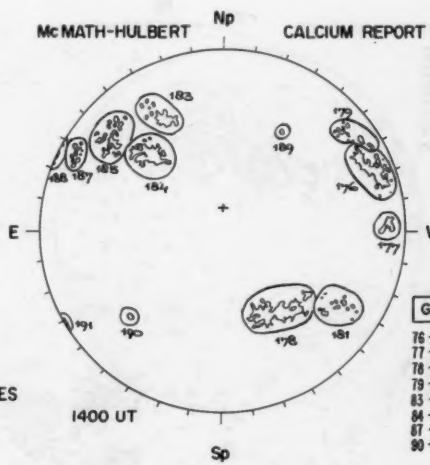
SUNSPOTS

PROMINENCES

1955 UT

McMATH-HULBERT

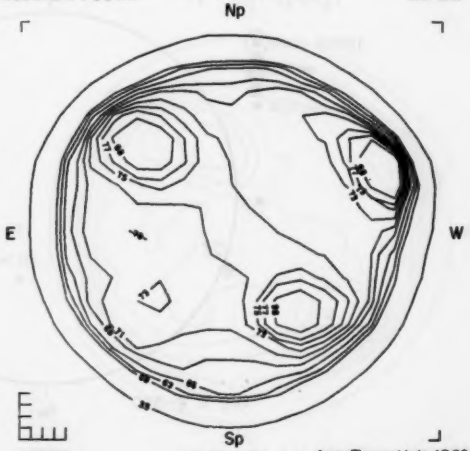
CALCIUM REPORT



1400 UT

GOOD	M
76 - 5200	-3.0
77 - 1200	-2.5
78 - 5000	-3.0
79 - 1200	-2.5
83 - 1400	-2.5
84 - 2700	-3.5
87 - 1400	-2.5
90 - 0300	-3.0

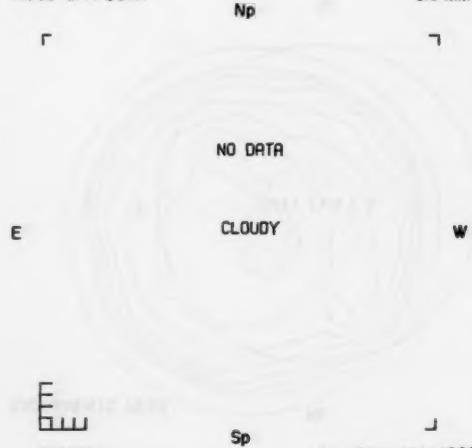
NOSC LA POSTA 2.0 CM



1817 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM



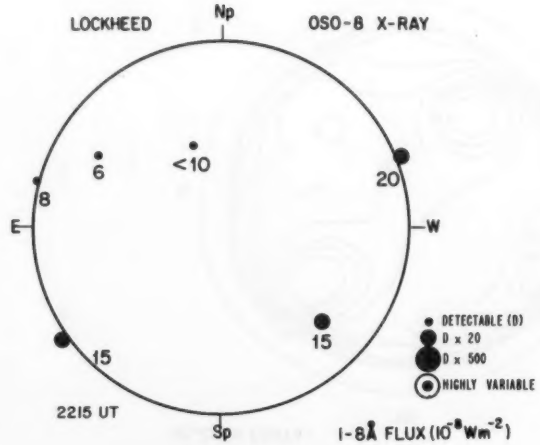
1710 UT

Ant. Temp. Unit 100°K

83
Mar 78

MARCH 19, 1978 (P =-25.01, B_o =-7.08, L_o =286.21)

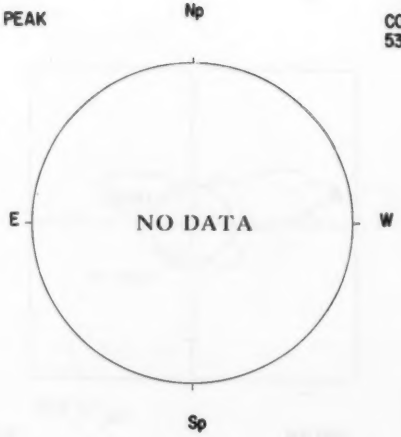
LOCKHEED OSO-8 X-RAY



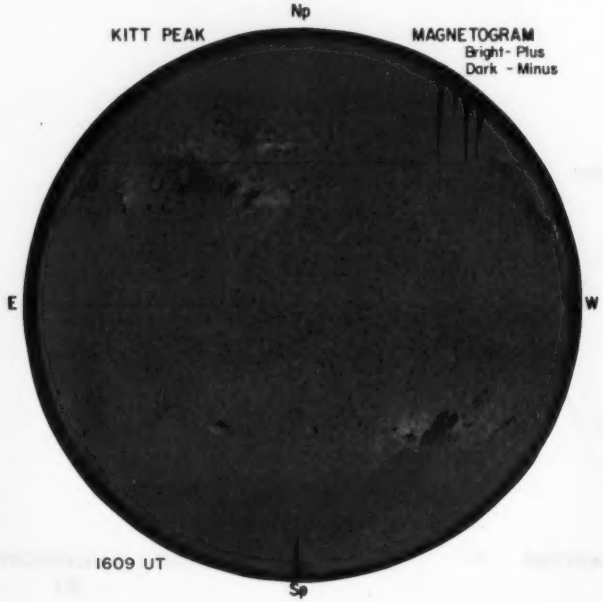
2215 UT

1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK

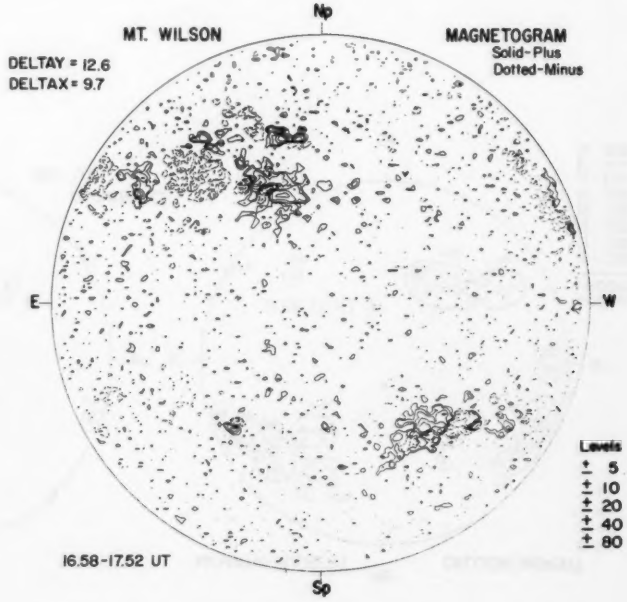


KITT PEAK



1609 UT

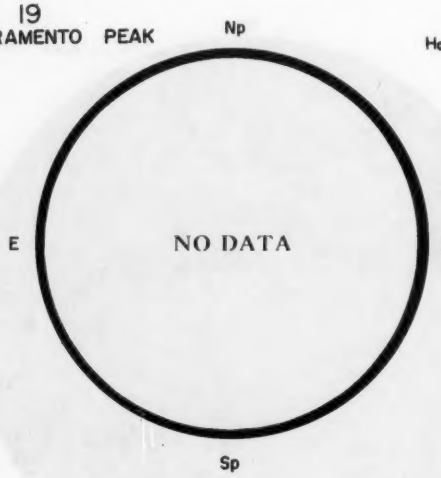
MT. WILSON



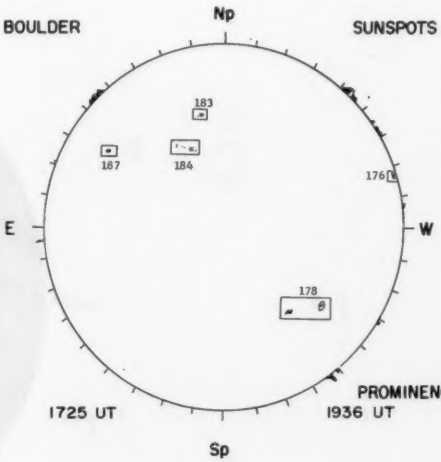
16.58-17.52 UT

19

SACRAMENTO PEAK

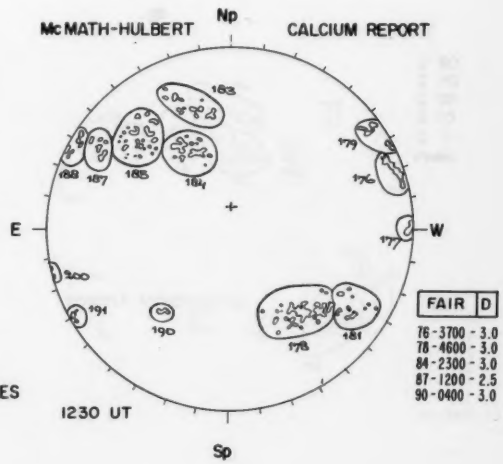


Hα BOULDER



1725 UT

SUNSPOTS



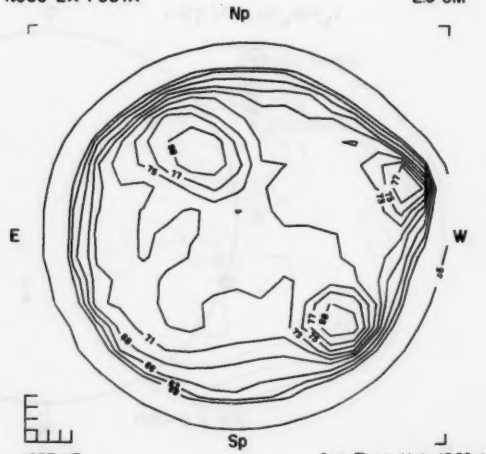
McMATH-HULBERT 1230 UT

CALCIUM REPORT

FAIR	D
76 - 3700 - 3.0	
78 - 4600 - 3.0	
84 - 2300 - 3.0	
87 - 1200 - 2.5	
90 - 0400 - 3.0	

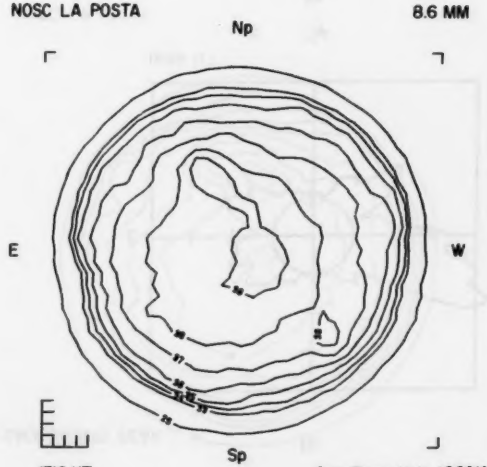
PROMINENCES 1936 UT

NOSC LA POSTA 2.0 CM



1637 UT Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM

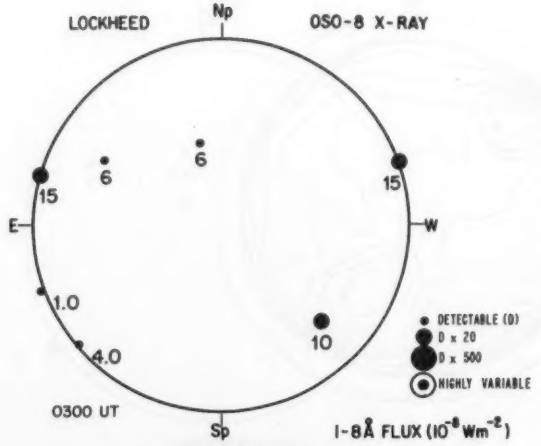


1716 UT Ant. Temp. Unit 100°K

85
Mar 78

MARCH 20, 1978 (P=-25.15, B_o=-7.05, L_o=273.03)

LOCKHEED OSO-8 X-RAY

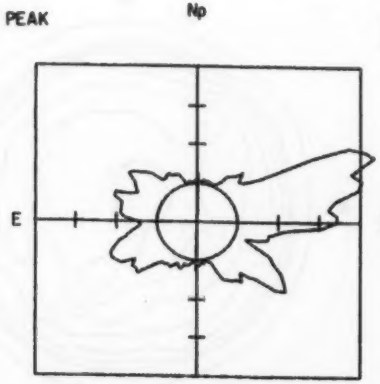


0300 UT

1-8Å FLUX (10^{-8} Wm^{-2})

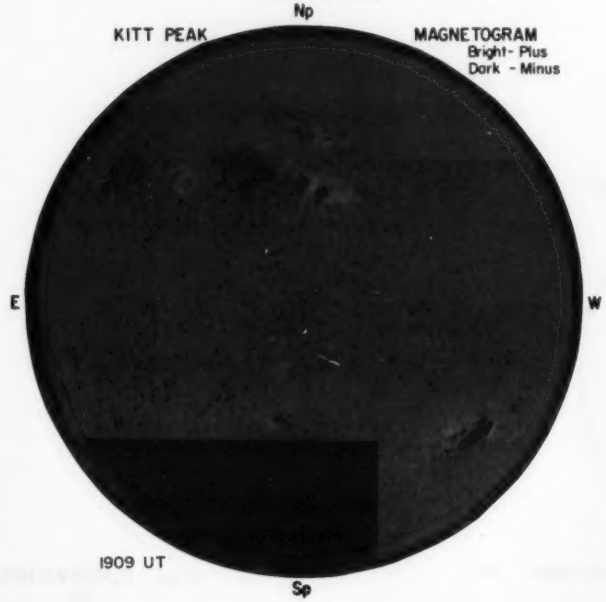
SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



1936 UT

KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1909 UT

MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

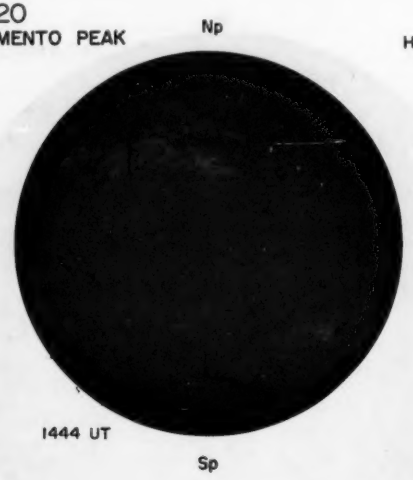
DELTAY =
DELTAX =

NO DATA MARCH 20-27

Levels
± 5
± 10
± 20
± 40
± 80

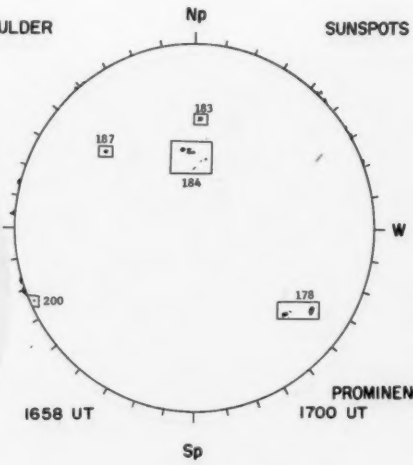
20

SACRAMENTO PEAK



1444 UT

Hα BOULDER



1658 UT

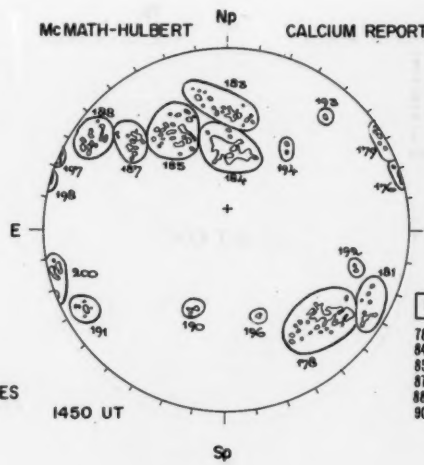
SUNSPOTS

PROMINENCES

1700 UT

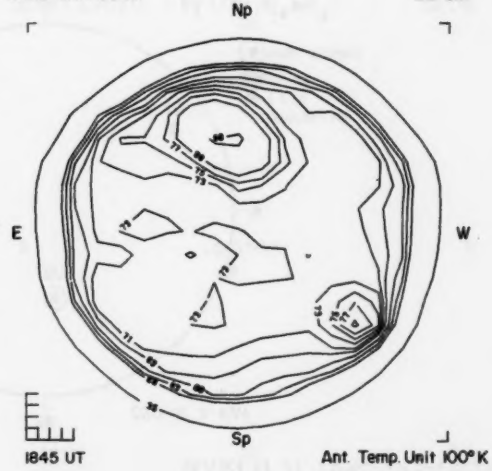
McMATH-HULBERT

CALCIUM REPORT



1450 UT

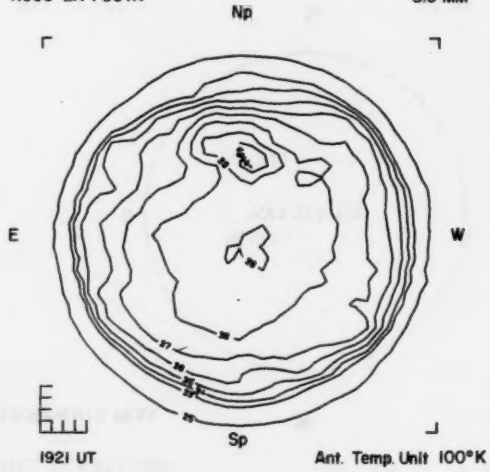
NOSC LA POSTA 2.0 CM



1845 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM



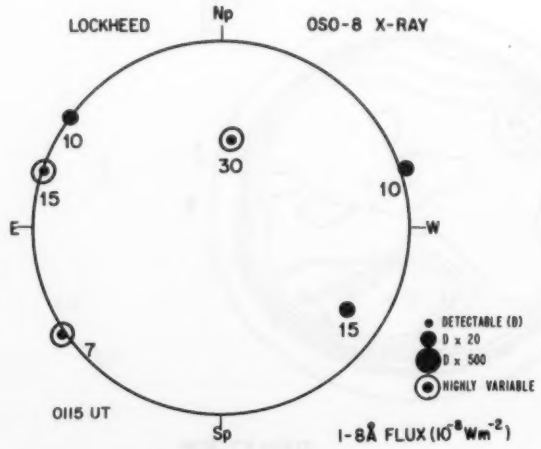
1921 UT

Ant. Temp. Unit 100°K

87
Mar 78

MARCH 21, 1978 (P=-25.27, B_o=-7.02, L_o=259.84)

LOCKHEED OSO-8 X-RAY

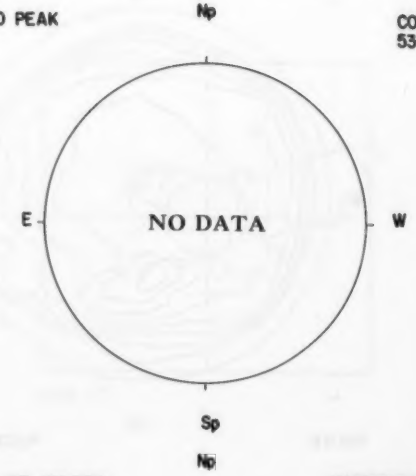


0115 UT

1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



KITT PEAK

MAGNETOGRAM
Bright - Plus
Dark - Minus

2144 UT

MT. WILSON

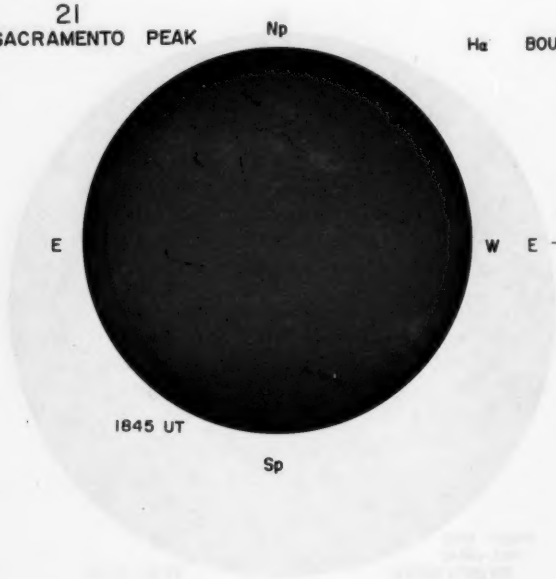
MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =

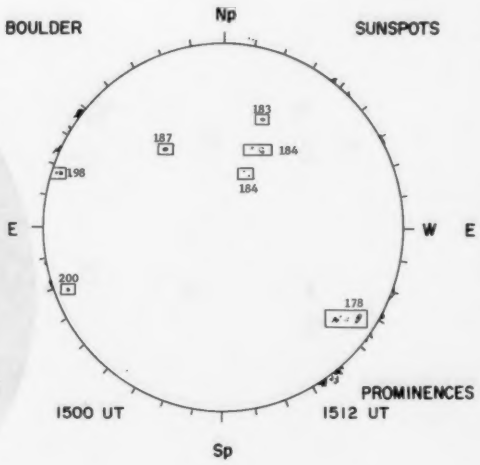
Levels
± 5
± 10
± 20
± 40
± 80

21

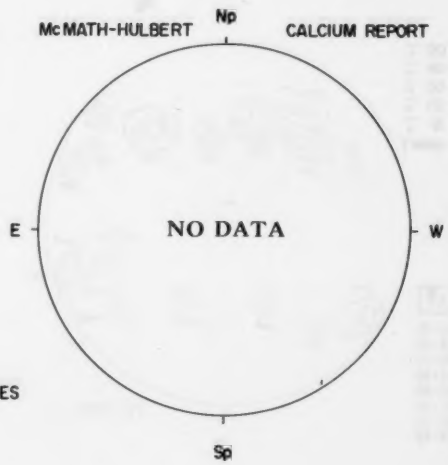
SACRAMENTO PEAK



BOULDER SUNSPOTS



McMATH-HULBERT CALCIUM REPORT

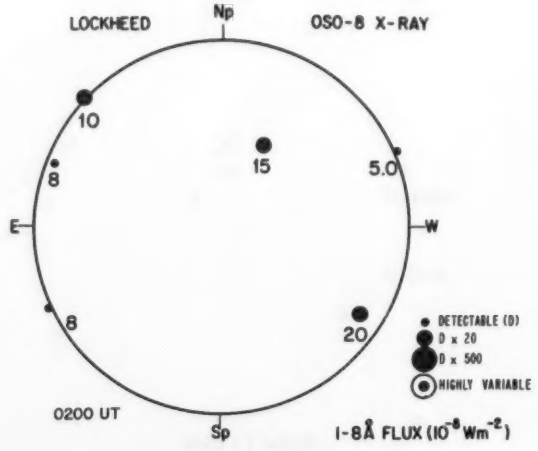


NOSC LA POSTA 2.0 CM

NOSC LA POSTA 8.6 MM

MARCH 22, 1978 (P=-25.39, B_o=-6.98, L_o=246.66)

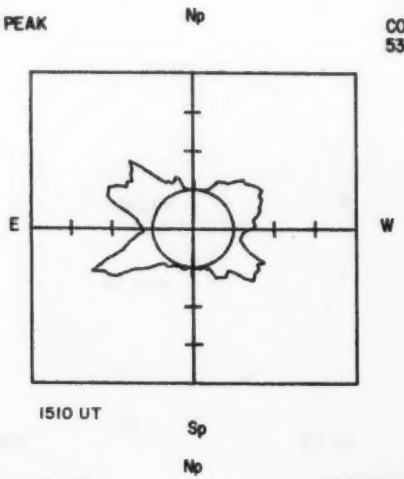
LOCKHEED OSO-8 X-RAY



0200 UT

1-8Å FLUX (10^{-6} Wm^{-2})

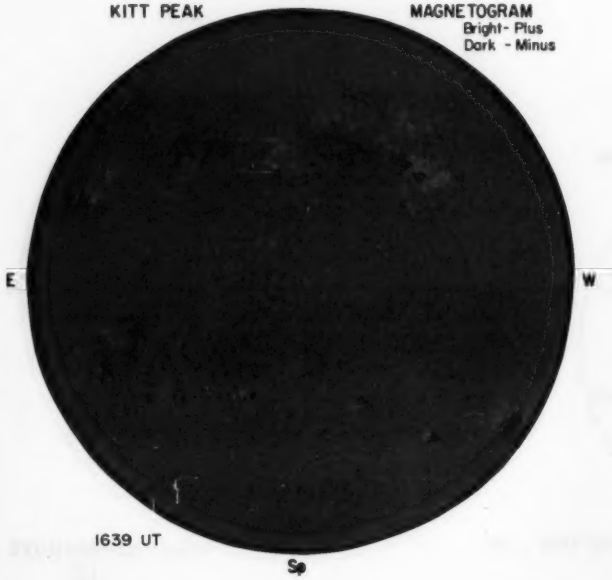
SACRAMENTO PEAK



CORONA (1.15 $R_\odot$)
5303 Å

1510 UT

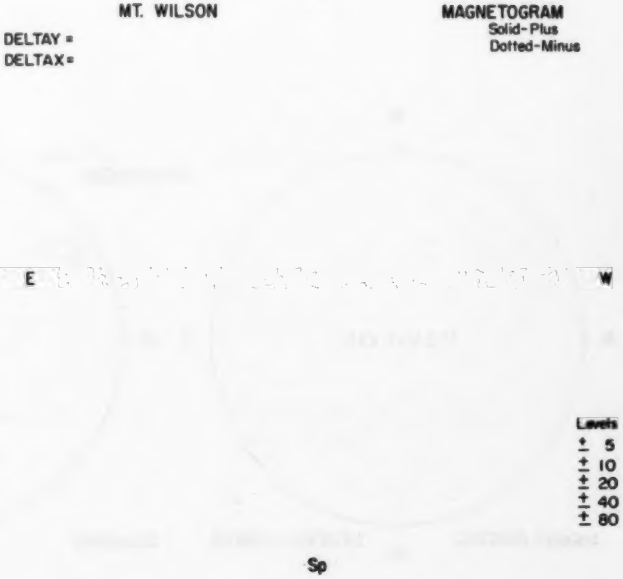
KITT PEAK



MAGNETOGRAM
Bright - Plus
Dark - Minus

1639 UT

MT. WILSON



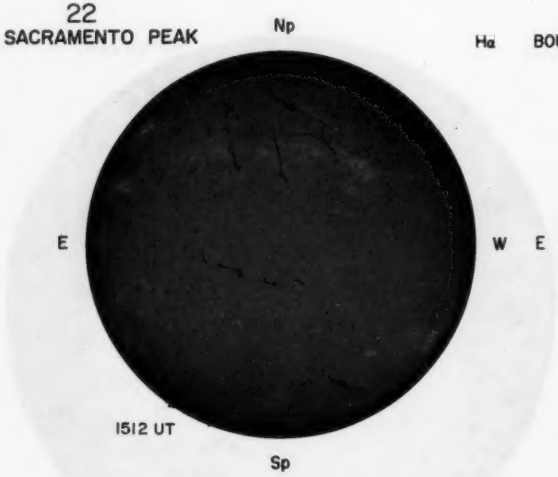
DELTAY =
DELTAX=

MAGNETOGRAM
Solid - Plus
Dotted - Minus

Levels
± 5
± 10
± 20
± 40
± 80

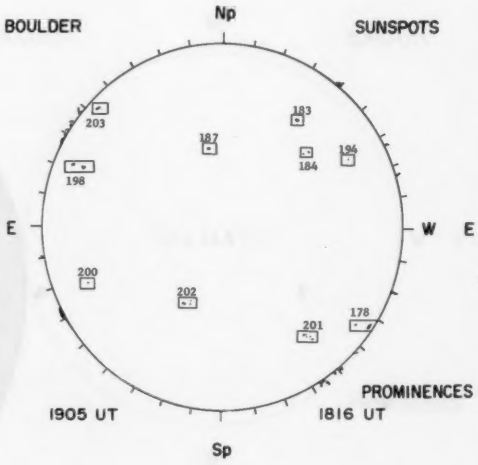
22

SACRAMENTO PEAK



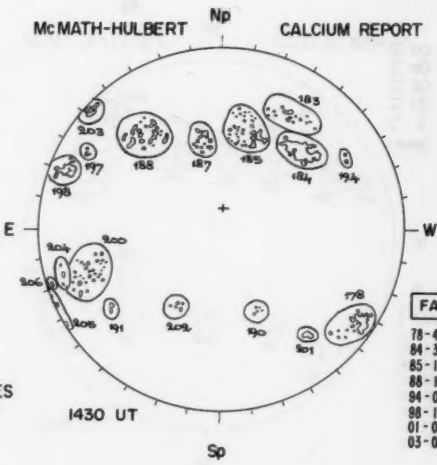
Hα

BOULDER



SUNSPOTS

McMATH-HULBERT



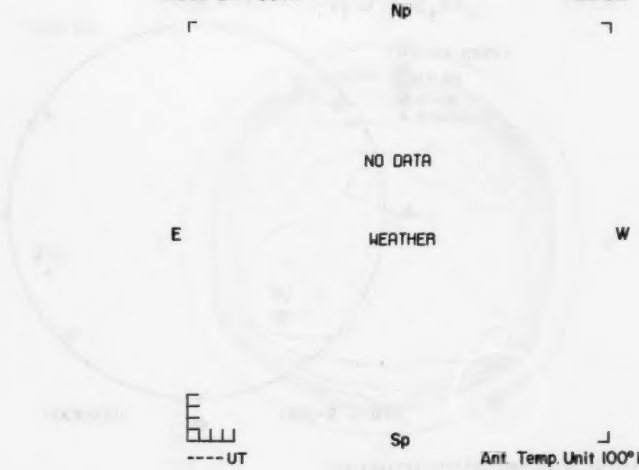
CALCIUM REPORT

PROMINENCES

FAIR	S
78 - 4100	- 3.5
84 - 3200	- 3.0
85 - 1700	- 2.5
88 - 1400	- 2.5
94 - 0200	- 2.5
98 - 1500	- 3.0
01 - 0500	- 3.5
03 - 0900	- 3.0

NOSC LA POSTA

2.0 CM

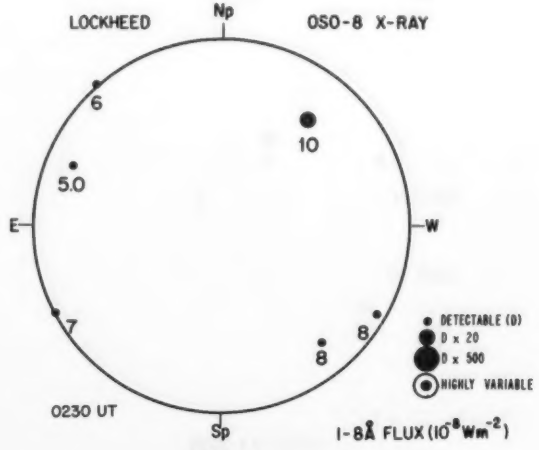


NOSC LA POSTA

8.6 MM

MARCH 23, 1978 (P=-25.50, B_o=-6.95, L_o=233.47)

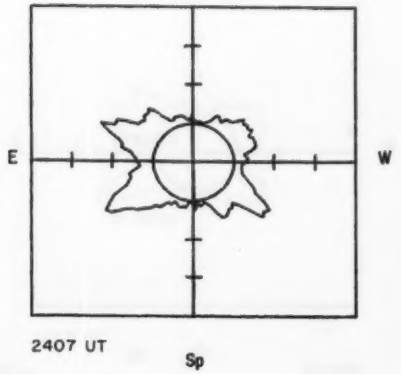
LOCKHEED OSO-8 X-RAY



1-8Å FLUX (10^{-8} Wm^{-2})

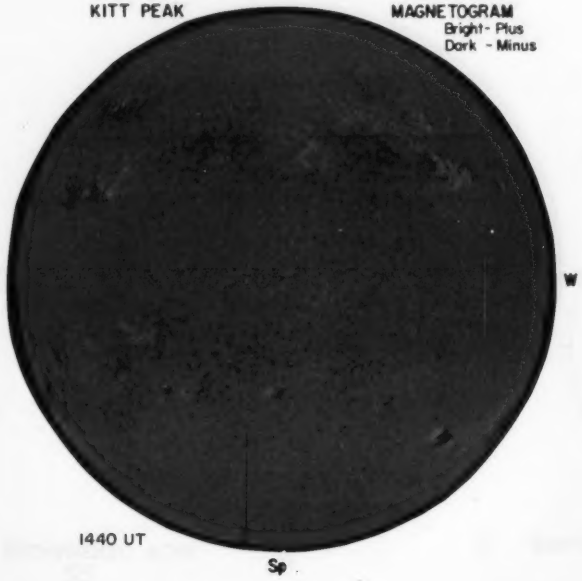
SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



2407 UT

KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



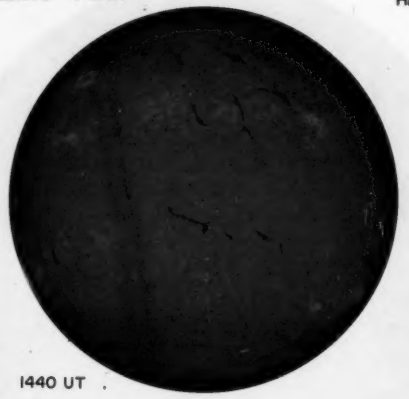
1440 UT

MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =

23

SACRAMENTO PEAK



1440 UT

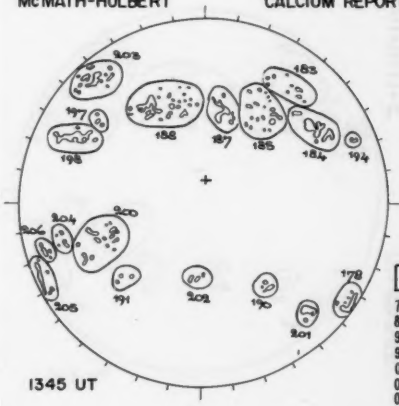
Hα BOULDER

SUNSPOTS

PROMINENCES

McMATH-HULBERT

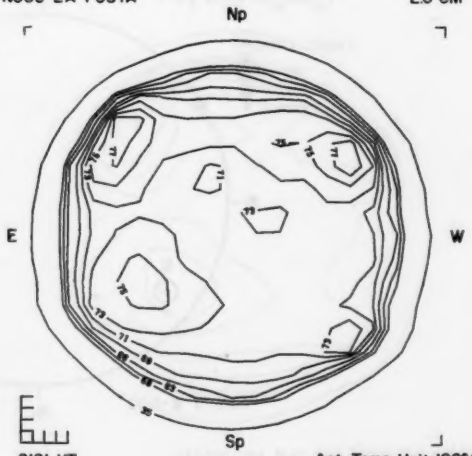
CALCIUM REPORT



1345 UT

FAIR	S
78 - 3100 - 3.0	
84 - 2800 - 3.5	
94 - 0200 - 2.5	
98 - 1600 - 3.0	
01 - 1000 - 4.0	
03 - 2100 - 3.5	
05 - 1800 - 2.5	

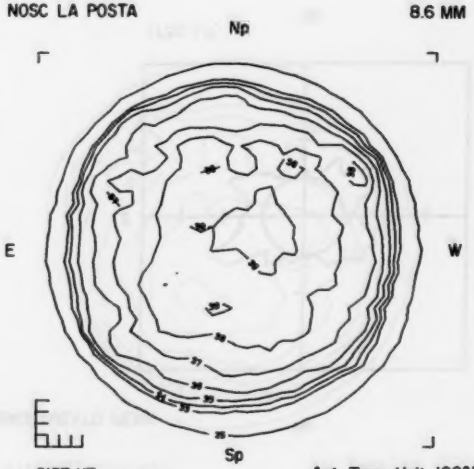
NOSC LA POSTA 2.0 CM



2121 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM



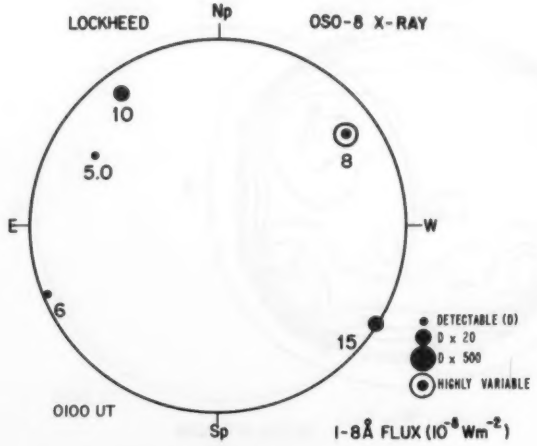
2157 UT

Ant. Temp. Unit 100°K

93
Mar 78

MARCH 24, 1978 (P=-25.61, B_0=-6.91, L_0=220.29)

LOCKHEED OSO-8 X-RAY

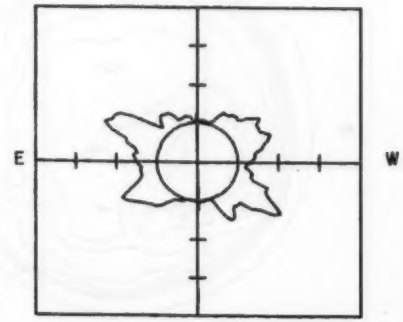


0100 UT

1-8Å FLUX (10^{-8} Wm^{-2})

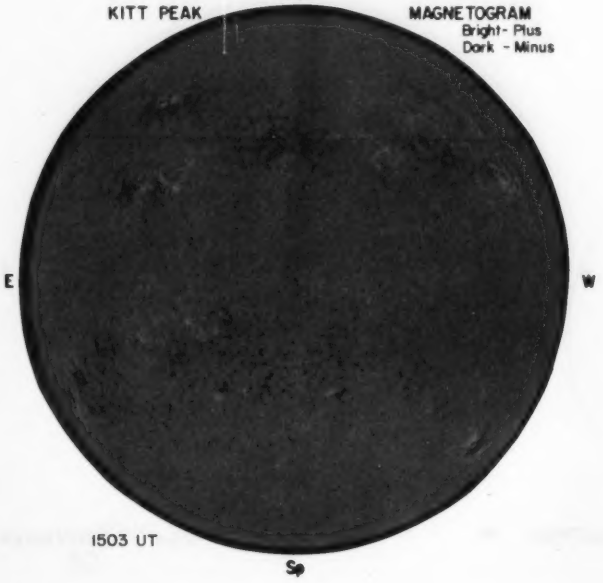
SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



1730 UT

KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1503 UT

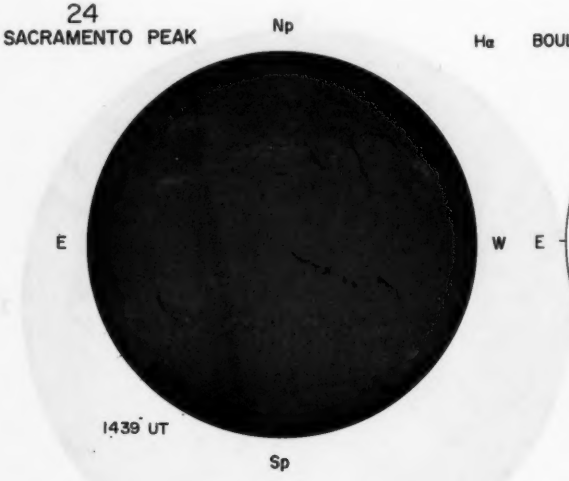
MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =

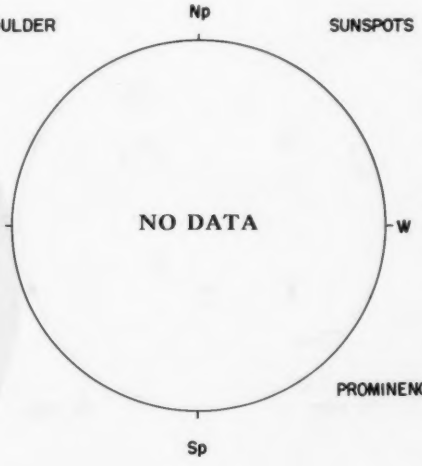
Levels
± 5
± 10
± 20
± 40
± 80

24

SACRAMENTO PEAK



Hα BOULDER

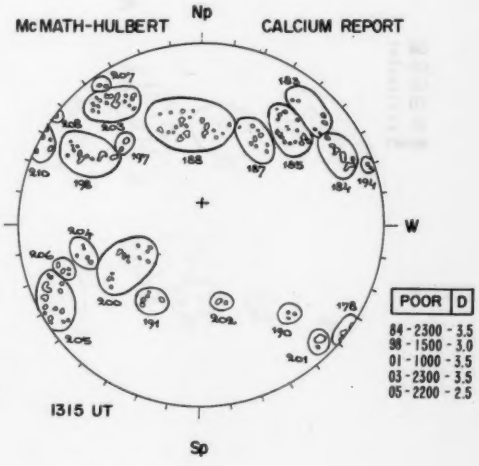


SUNSPOTS

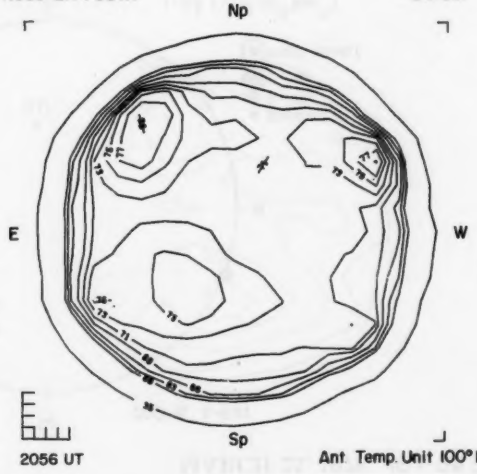
PROMINENCES

McMATH-HULBERT

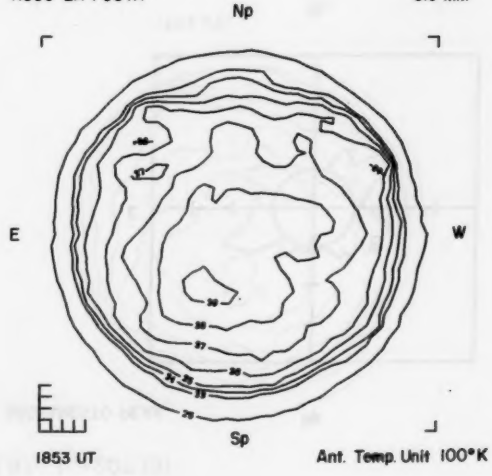
CALCIUM REPORT



NOSC LA POSTA 2.0 CM



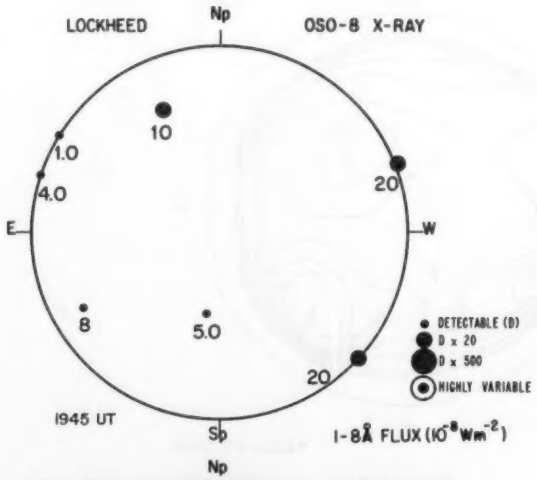
NOSC LA POSTA 8.6 MM



95
Mar 78

MARCH 25, 1978 (P =-25.70, B_o =-6.87, L_o =207.10)

LOCKHEED OSO-8 X-RAY

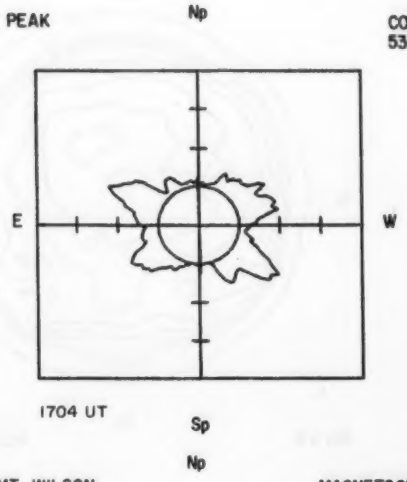


1945 UT

1-8Å FLUX (10^{-8} Wm^{-2})

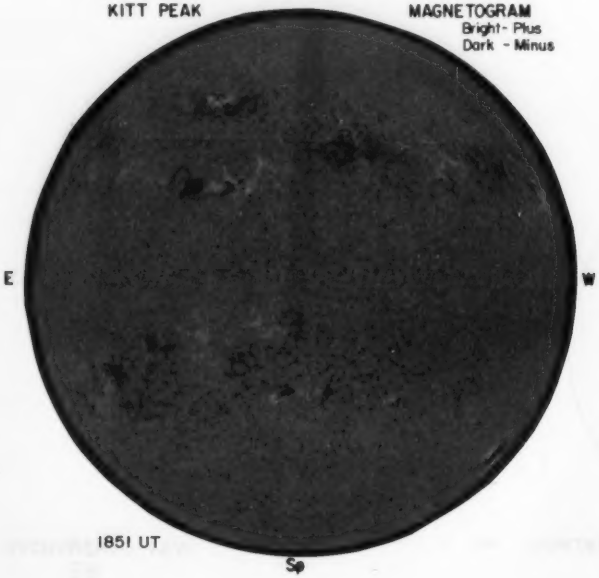
SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



1704 UT

KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1851 UT

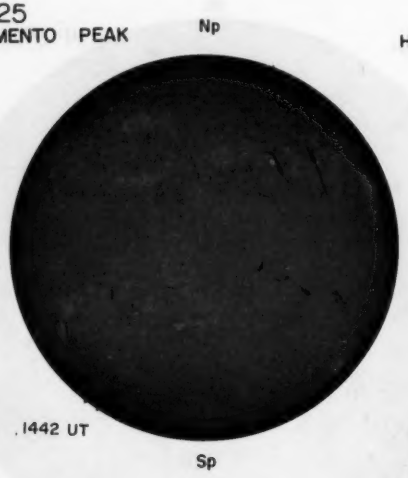
MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =

Levels
± 5
± 10
± 20
± 40
± 80

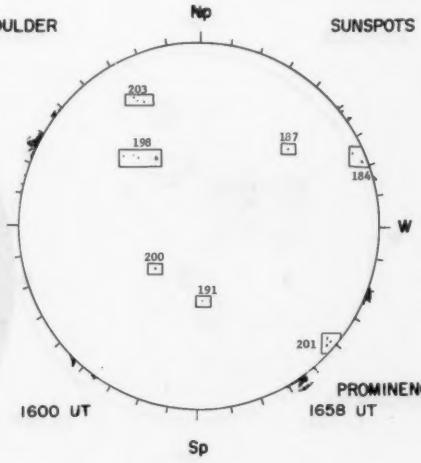
25

SACRAMENTO PEAK



1442 UT

Hα BOULDER



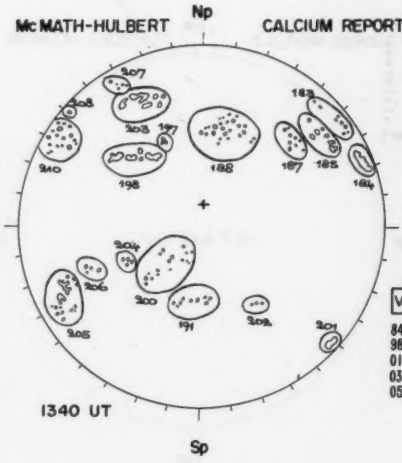
1600 UT

SUNSPOTS

PROMINENCES

1658 UT

McMATH-HULBERT

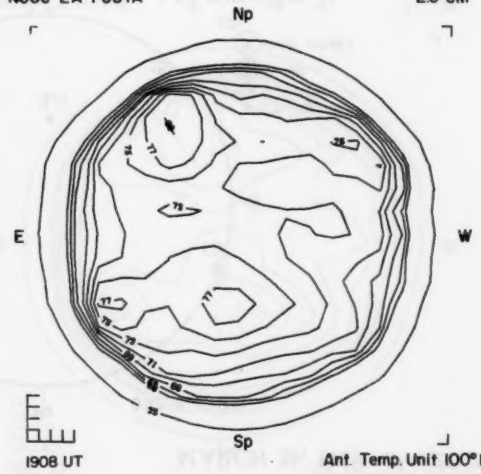


1340 UT

CALCIUM REPORT

V POOR	M
84 - 2300 - 3.5	
98 - 1700 - 3.0	
01 - 1200 - 3.5	
03 - 2300 - 3.0	
05 - 2500 - 2.5	

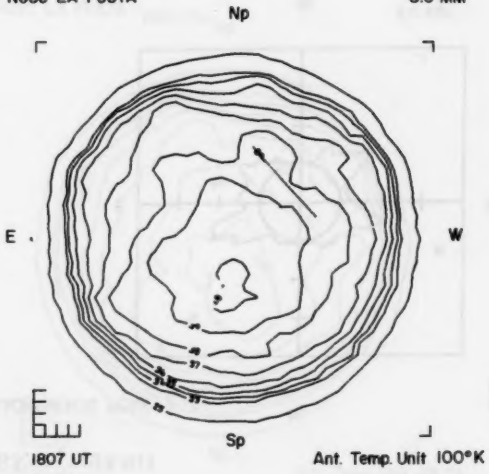
NOSC LA POSTA 2.0 CM



1908 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM



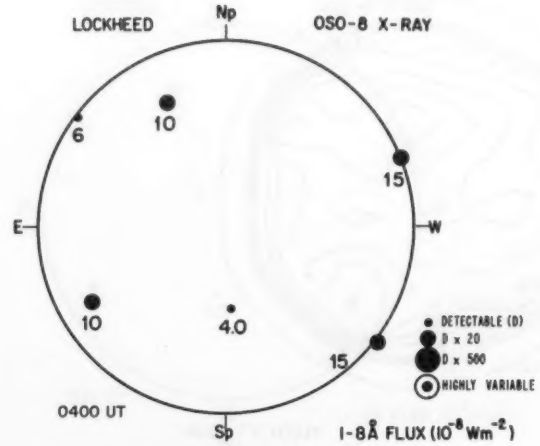
1807 UT

Ant. Temp. Unit 100°K

97
Mar 78

MARCH 26, 1978 (P =-25.79, B_0 =-6.83, L_0 =193.91)

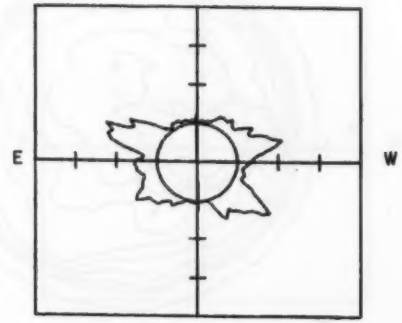
LOCKHEED — OSO-8 X-RAY



0400 UT

1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK — CORONA (1.15 $R_\odot$) 5303 Å



1609 UT

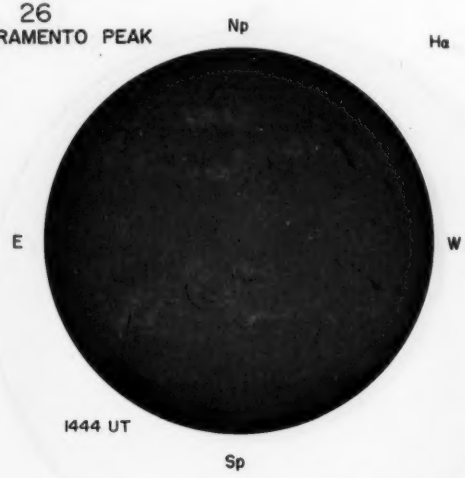
KITT PEAK — MAGNETOGRAM
Bright - Plus
Dark - Minus

1522 UT

MT. WILSON — MAGNETOGRAM
Solid - Plus
Dotted - Minus

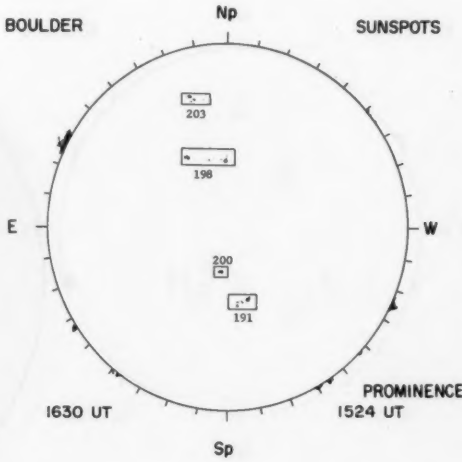
DELTAY =
DELTAX =

SACRAMENTO PEAK Hα



1444 UT

BOULDER SUNSPOTS

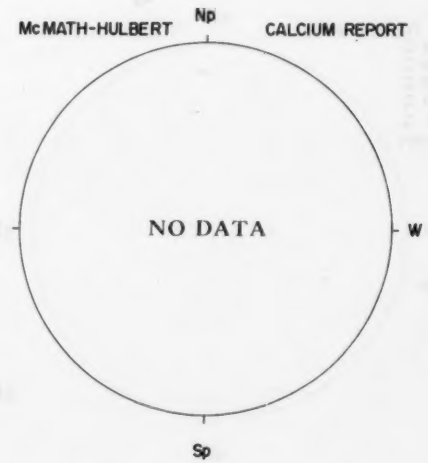


1630 UT

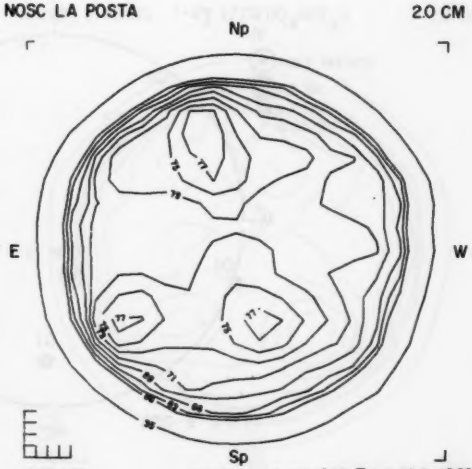
PROMINENCES

1524 UT

McMATH-HULBERT CALCIUM REPORT



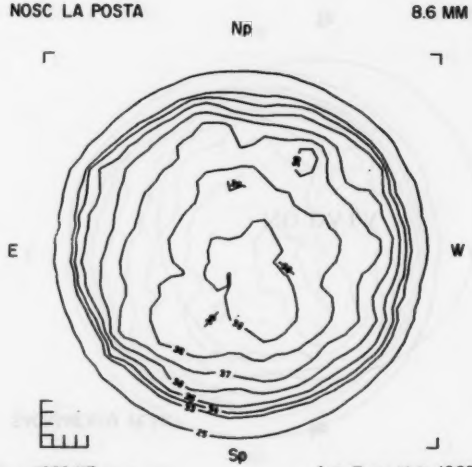
NOSC LA POSTA 2.0 CM



1949 UT

Ant. Temp. Unit 100° K

NOSC LA POSTA 8.6 MM

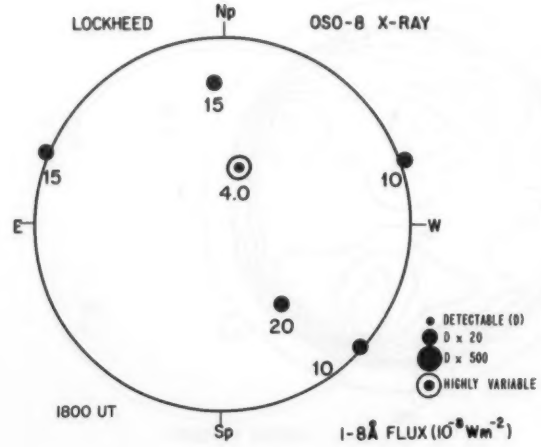


1852 UT

Ant. Temp. Unit 100° K

MARCH 27, 1978 (P=-25.88, B_o=-6.79, L_o=180.72)

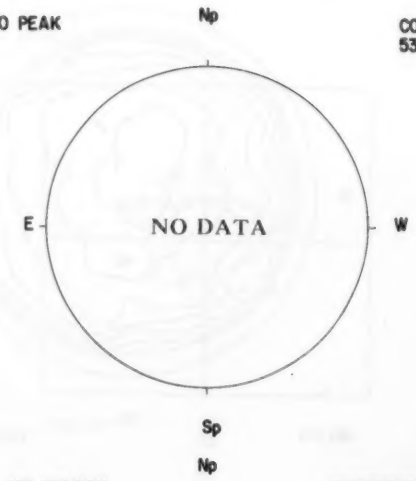
LOCKHEED OSO-8 X-RAY



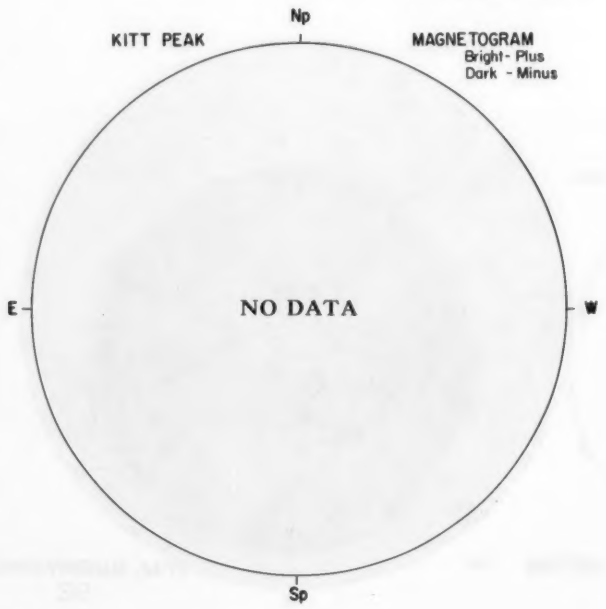
1800 UT

1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK



KITT PEAK

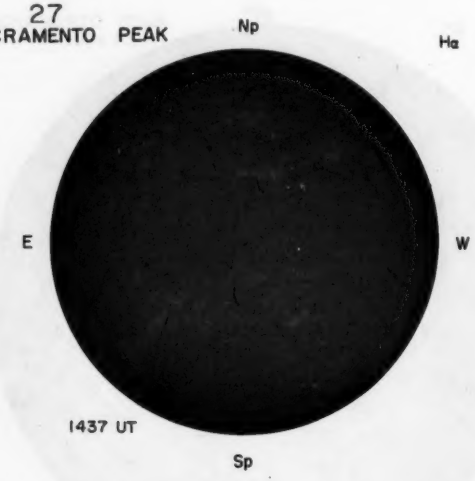


MT. WILSON

DELTAY =
DELTAX =

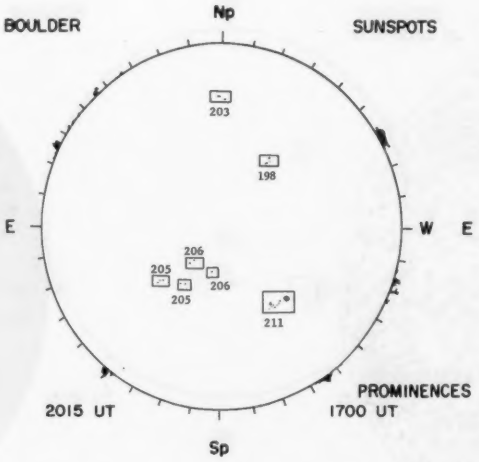
27

SACRAMENTO PEAK



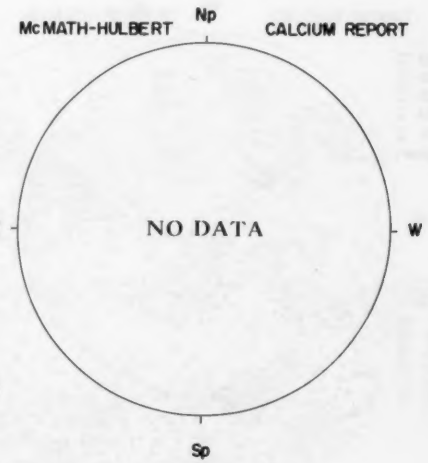
1437 UT

Hα BOULDER



2015 UT

SUNSPOTS



PROMINENCES

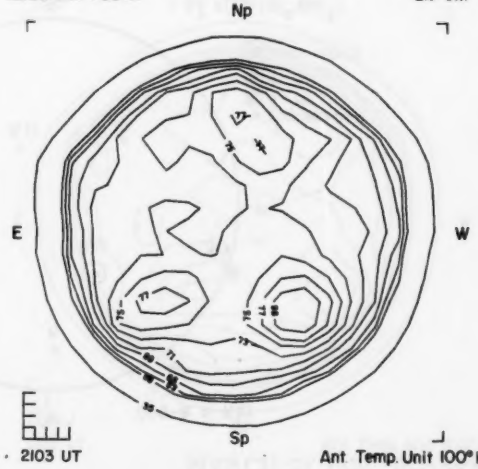
1700 UT

McMATH-HULBERT

CALCIUM REPORT

NOSC LA POSTA

2.0 CM

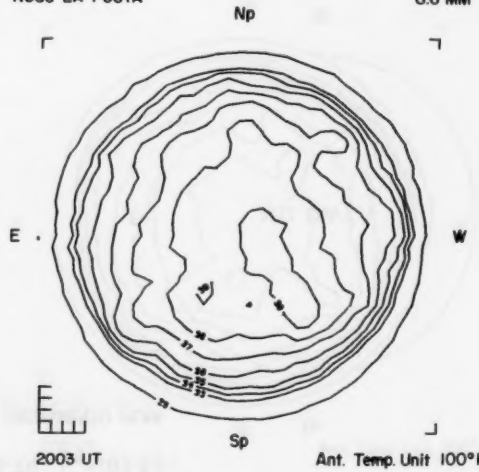


2103 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

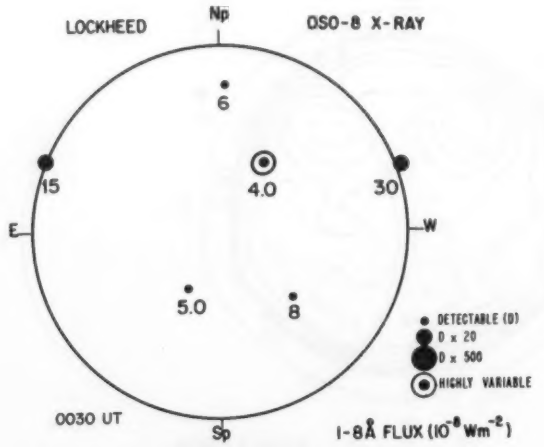


2003 UT

Ant. Temp. Unit 100°K

MARCH 28, 1978 (P=-25.95, B_o=-6.74, L_o=167.53)

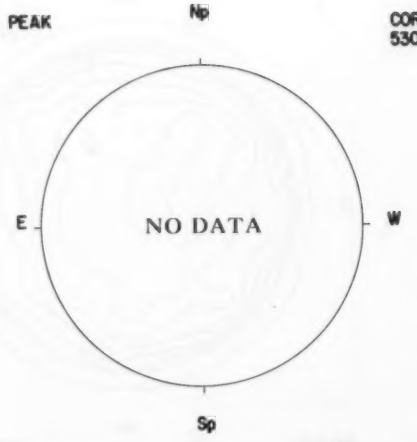
LOCKHEED OSO-8 X-RAY



0030 UT

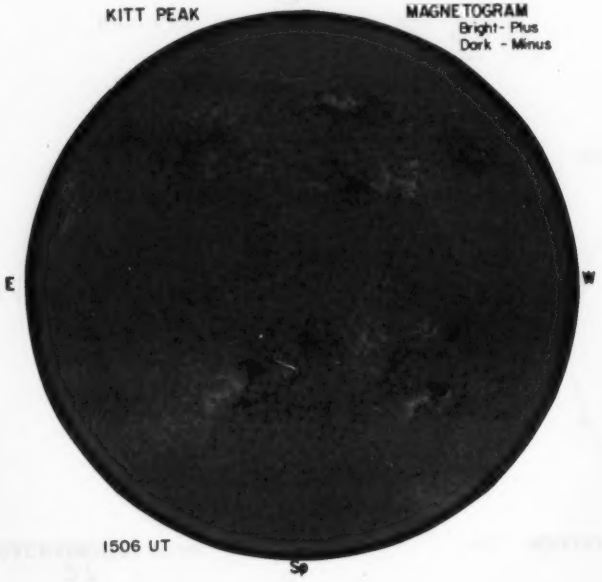
1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK



KITT PEAK MAGNETOGRAM

Bright - Plus
Dark - Minus

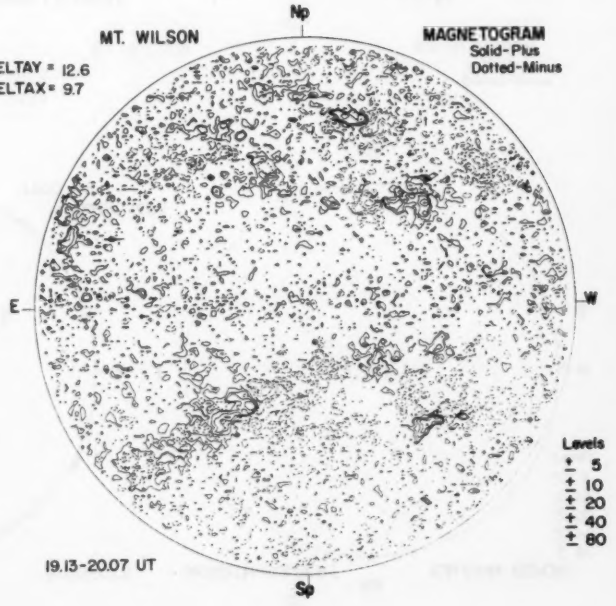


1506 UT

MT. WILSON MAGNETOGRAM

Solid - Plus
Dotted - Minus

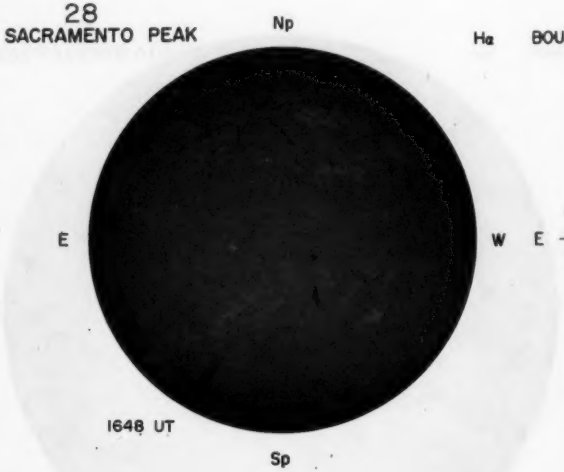
DELTAY = 12.6
DELTAX = 9.7



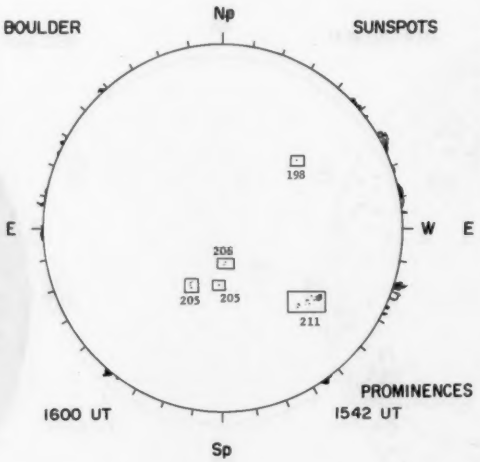
19.13-20.07 UT

28

SACRAMENTO PEAK

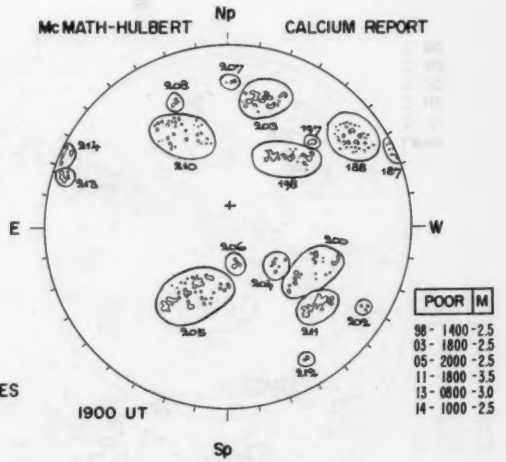


BOULDER SUNSPOTS



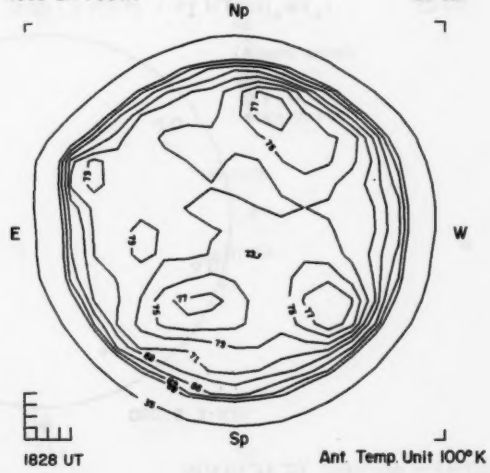
PROMINENCES 1542 UT

McMATH-HULBERT CALCIUM REPORT

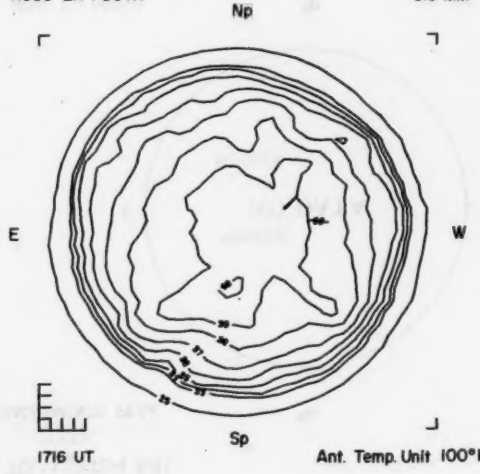


POOR	M
98 - 1400 - 2.5	
03 - 1800 - 2.5	
05 - 2000 - 2.5	
11 - 1800 - 3.5	
13 - 0800 - 3.0	
14 - 1000 - 2.5	

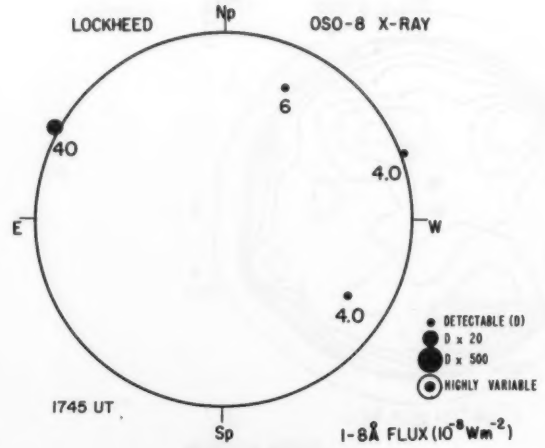
NOSC LA POSTA 2.0 CM

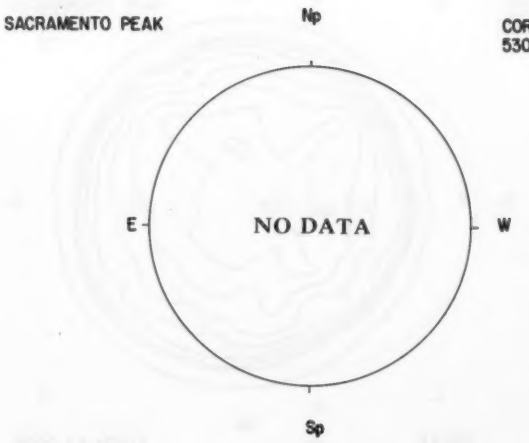


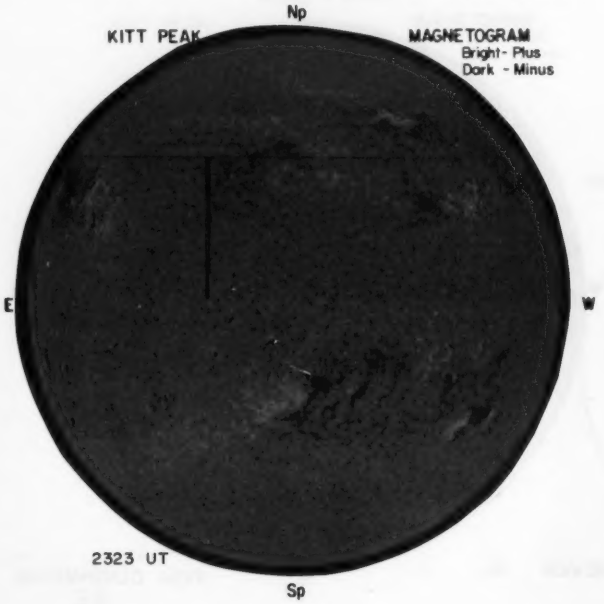
NOSC LA POSTA 8.6 MM

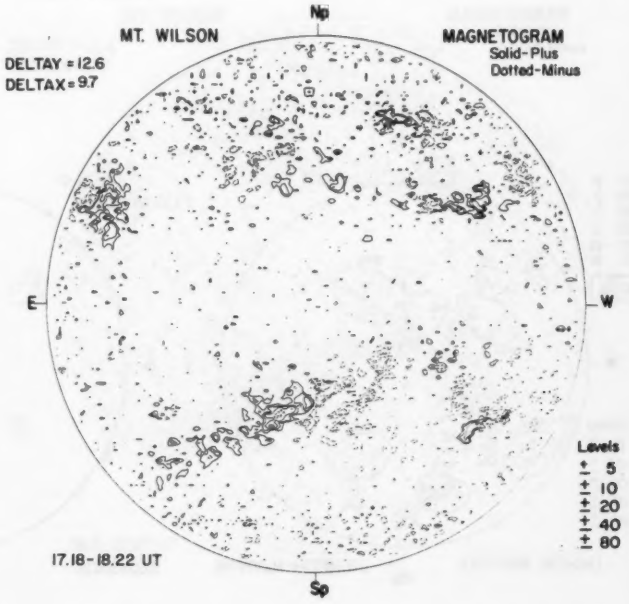


MARCH 29, 1978 (P=-26.02, B_o=-6.70, L_o=154.34)



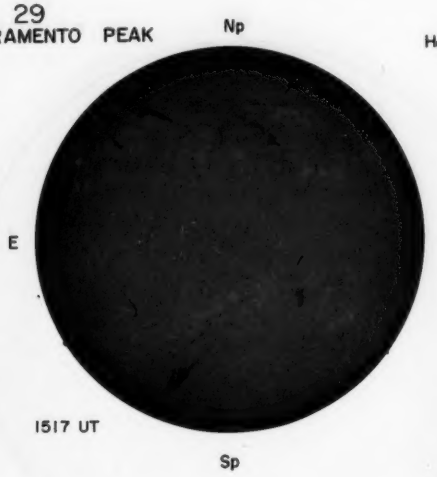






29

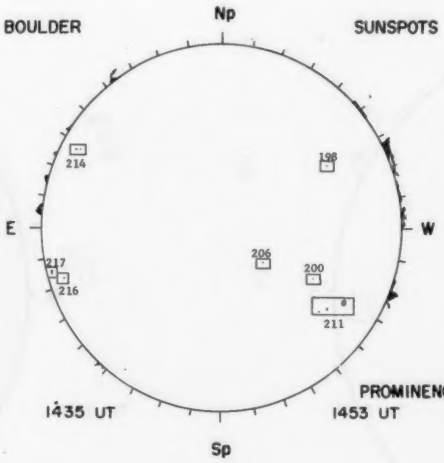
SACRAMENTO PEAK



1517 UT

Hα

BOULDER



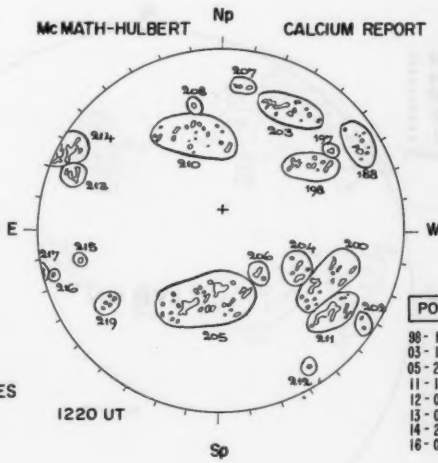
1435 UT

SUNSPOTS

PROMINENCES

1453 UT

McMATH-HULBERT



1220 UT

CALCIUM REPORT

POOR	S

98 - 1400 - 2.5
03 - 1400 - 2.5
05 - 2200 - 3.0
11 - 1800 - 3.0
12 - 0100 - 2.5
13 - 0700 - 3.0
14 - 2400 - 2.5
16 - 0100 - 2.5

NOSC LA POSTA

Np

2.0 CM

NO DATA

E

WEATHER

W

Sp

---- UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

Np

8.6 MM

NO DATA

E

WEATHER

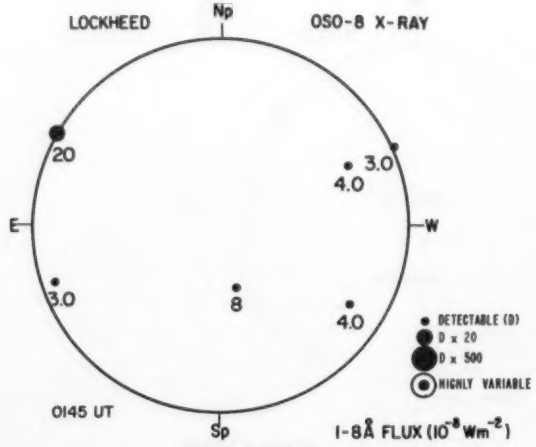
W

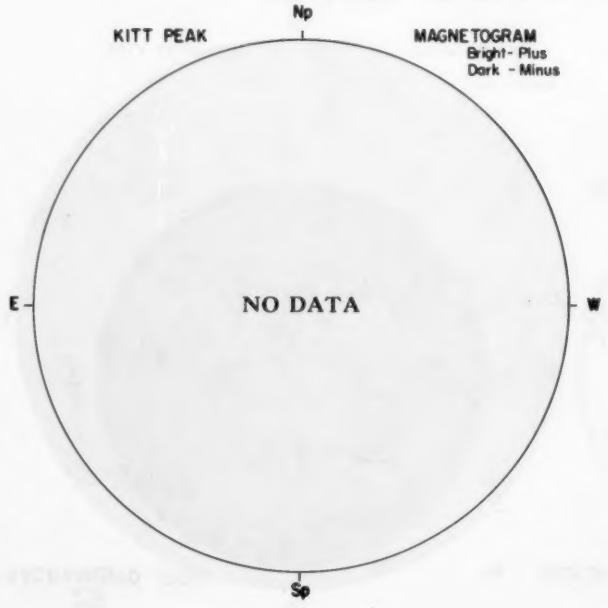
Sp

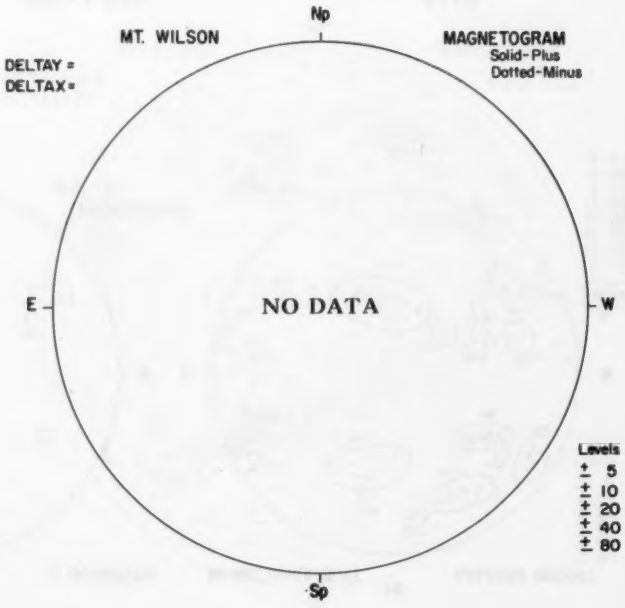
---- UT

Ant. Temp. Unit 100°K

MARCH 30, 1978 (P = -26.09, B_o = -6.65, L_o = 141.15)

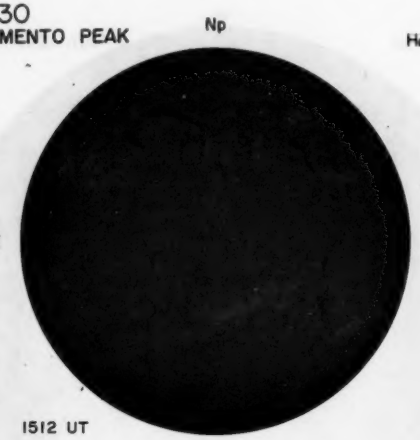






30

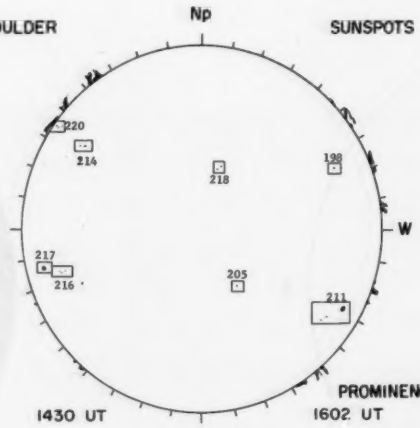
SACRAMENTO PEAK



1512 UT

Hα

BOULDER



1430 UT

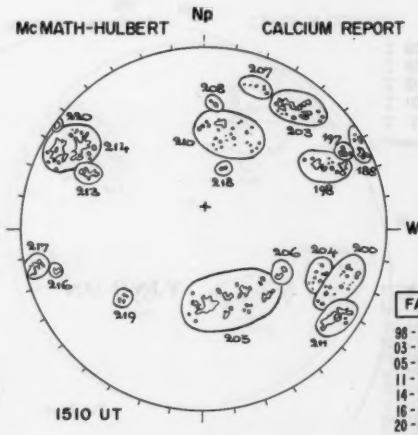
SUNSPOTS

PROMINENCES

1602 UT

McMATH-HULBERT

CALCIUM REPORT

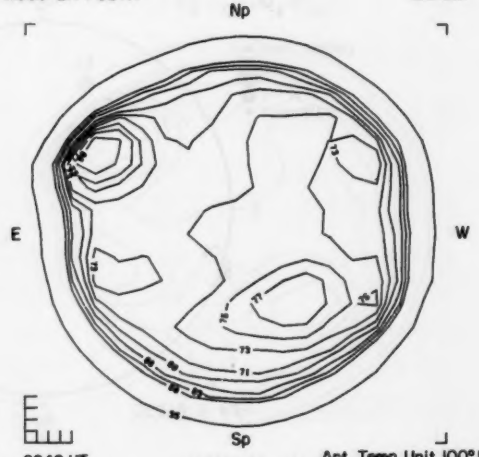


1510 UT

FAIR	M
98 - 1400 - 2.5	
03 - 1600 - 2.5	
05 - 2200 - 3.0	
11 - 1800 - 3.0	
14 - 3400 - 2.5	
16 - 0300 - 3.5	
20 - 0700 - 2.5	

NOSC LA POSTA

2.0 CM



2040 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

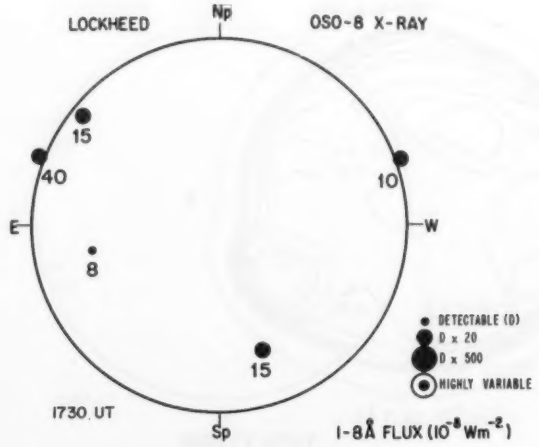
---- UT

Ant. Temp. Unit 100°K

107
Mar 78

MARCH 31, 1978 (P=-26.14, B_o=-6.60, L_o=127.96)

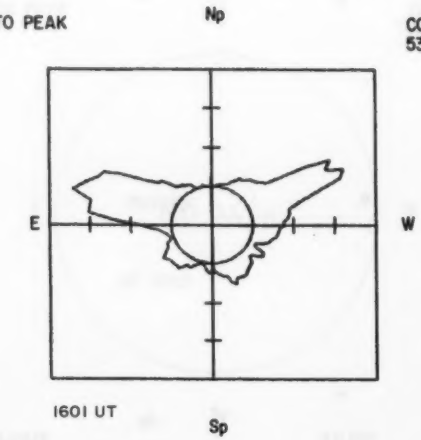
LOCKHEED OSO-8 X-RAY



1730 UT

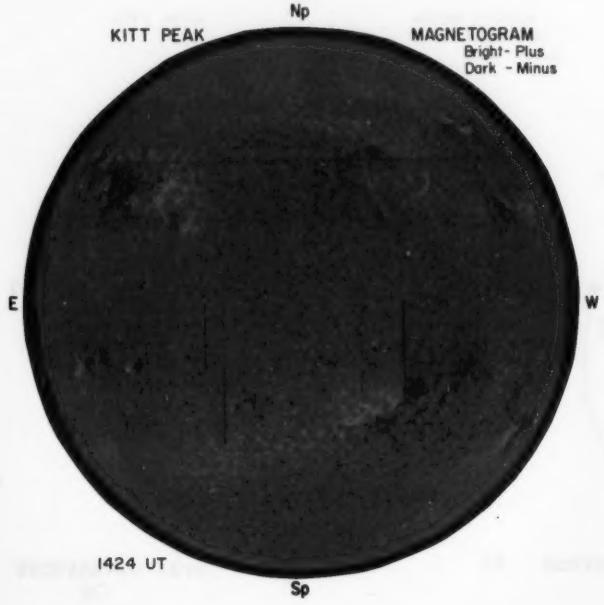
1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å



1601 UT

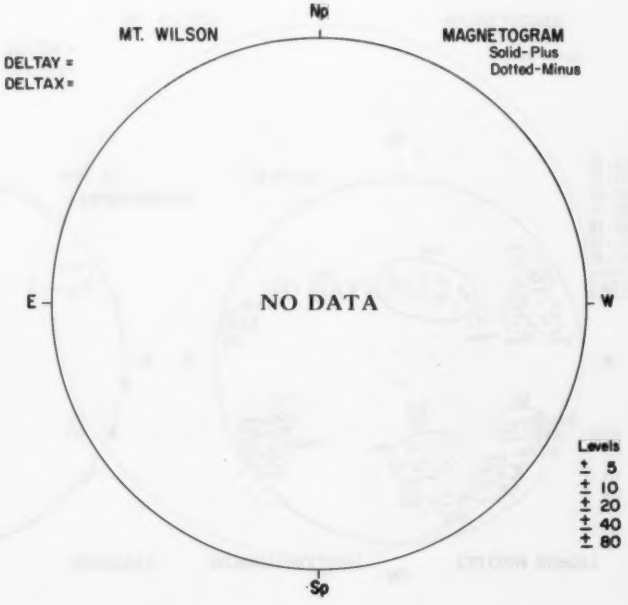
KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1424 UT

MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =



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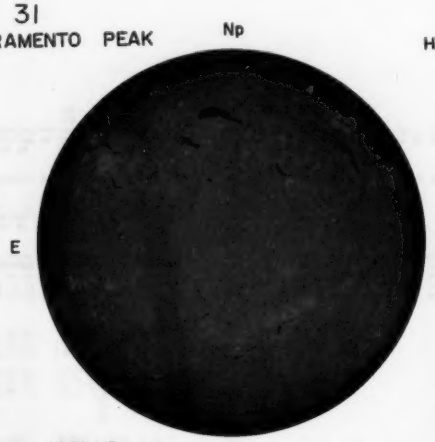
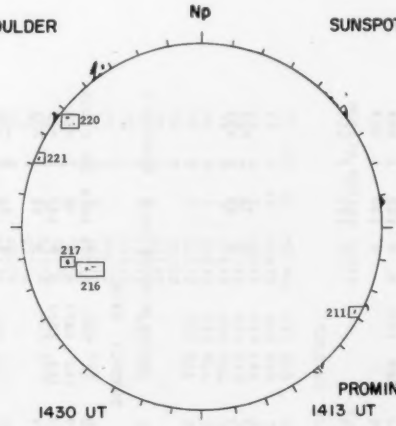
SACRAMENTO PEAK



1440 UT

Hα

BOULDER

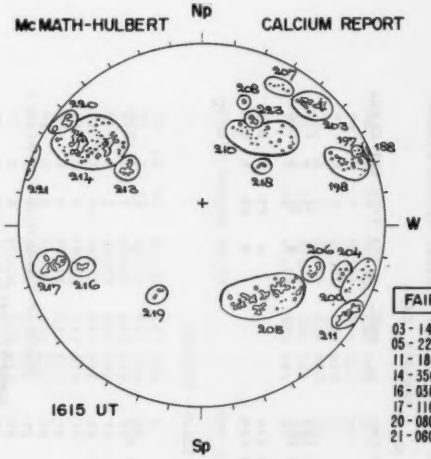


1430 UT

SUNSPOTS

1413 UT

McMATH-HULBERT



1615 UT

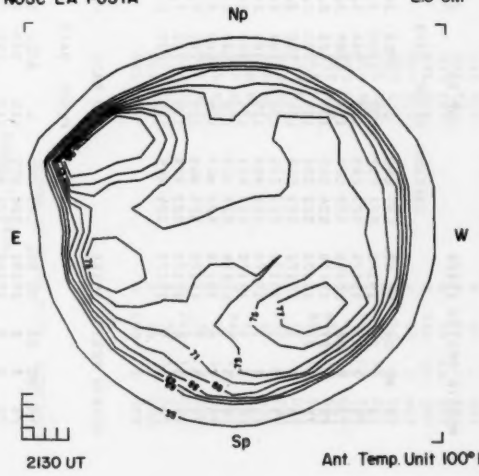
CALCIUM REPORT

PROMINENCES

FAIR	M
03 - 1400 - 3.0	
05 - 2200 - 2.5	
11 - 1800 - 3.0	
14 - 3500 - 2.5	
16 - 0300 - 3.0	
17 - 1100 - 3.0	
20 - 0800 - 3.0	
21 - 0600 - 3.5	

NOSC LA POSTA

2.0 CM



2130 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

NO DATA

WEATHER

----UT

Ant. Temp. Unit 100°K

REGIONS OF SOLAR ACTIVITY

MARCH 1978

MCMATH REGION 15166 CMP DATE 1.7 — RETURN OF REGION 15124 ROTATION 2

CALCIUM PLAGE DATA / SUNSPOT DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	22	15166	S25 E90	156	1200	2.0									
78	2	23	15166	S27 E77	156	2800	3.0									
78	2	24	15166	S25 E65	154	3200	3.0									
78	2	25	15166	S27 E53	154	3400	3.0		S23 E53				H	80	3	CSO
78	2	26	15166	S27 E41	154	3400	2.5		S23 E41				H	90	4	CSO
78	2	27	15166	S27 E28	152	3000	2.5									
78	2	28	15166	S27 E14	152	3000	2.5		S26 E16				R	20	7	BXO
78	2		15166						S23 E06				R	30	4	CSO
78	3	1	15166	S27 E01	153	3000	3.0									
78	3	2	15166	S26 W11	152	3000	3.0									
78	3	3	15166	S26 W26	153	3000	2.5									
78	3	4	15166	S26 W39	154	3400	3.0									
78	3	5	15166	S26 W52	154	3600	3.0									
78	3	6	15166	S26 W65	154	3200	2.5									
78	3	7	15166	S26 W77	152	2900	2.5		S23 W73				B	0	2	BXO
78	3	8	15166	S28 W88	149	2700	2.0									
78	3	9	15166	S31 W98	139	600	1.0									

MCMATH REGION 15168 CMP DATE 2.8 — RETURN OF REGION 15126 ROTATION 3

CALCIUM PLAGE DATA / SUNSPOT DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	24	15168	N25 E78	141	800	1.5	19965	N18 E75	144	(AP)	3	B	50	1	HSX
78	2	25	15168	N25 E65	142	1500	2.0	19965	N18 E62	145	(AP)	4	H	100	1	HSX
78	2	26	15168	N25 E54	141	2200	2.0		N19 E56				H	100	1	HSX
78	2	27	15168	N25 E42	138	2400	2.0									
78	2	28	15168	N25 E28	138	2400	2.0		N20 E23				R	100	2	CSO
78	3	1	15168	N25 E15	139	2500	2.5									
78	3	2	15168	N25 E03	138	2700	2.5									
78	3	3	15168	N25 W12	139	2500	2.5									
78	3	4	15168	N25 W24	139	2500	2.5									
78	3	5	15168	N25 W36	138	2500	2.5									
78	3	6	15168	N25 W50	139	2100	2.5		N18 W57				B	70	1	HSX
78	3	7	15168	N25 W65	140	2100	2.0		N18 W67				B	20	1	HSX
78	3	8	15168	N25 W78	139	1400	1.5									

MCMATH REGION 15170 CMP DATE 3.0 — RETURN OF REGION 15130 ROTATION 2

CALCIUM PLAGE DATA / SUNSPOT DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	24	15170	S23 E82	137	1000	3.0	19966	S25 E79	140	(AP)	4	B	90	1	HSX
78	2	25	15170	S23 E69	138	900	3.5	19966	S24 E67	140	(AP)	3	H	100	1	HSX
78	2	26	15170	S23 E58	137	1000	3.0		S24 E60				H	80	1	HSX
78	2	27	15170	S24 E45	135	800	2.5									
78	2	28	15170	S23 E31	135	800	2.5		S24 E30				R	50	4	CSO
78	3	1	15170	S23 E18	136	800	3.0									
78	3	2	15170	S23 E06	135	800	3.0									
78	3	3	15170	S23 W08	135	800	2.5									
78	3	4	15170	S23 W21	136	800	2.0									
78	3	5	15170	S23 W33	135	600	2.0									
78	3	6	15170	S23 W47	136	600	2.0									
78	3	7	15170	S23 W60	135	700	2.0									
78	3	8	15170	S23 W73	134	700	2.0									
78	3	9	15170	S24 W85	134	600	2.0									

MCMATH REGION 15180 CMP DATE 4.5

CALCIUM PLAGE DATA / SUNSPOT DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	8	15180	S20 W55	116	100	1.0									
78	3	9	15180	S21 W68	117	100	1.0									

MCMATH REGION 15174 CMP DATE 6.3

CALCIUM PLAGE DATA / SUNSPOT DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	3	15174	S25 E34	93	100	1.5									
78	3	4	15174	S25 E22	93	100	1.5									
78	3	5	15174	S25 E09	93	300	2.5		S23 E08				B	40	3	DSO
78	3	6	15174	S24 W04	93	500	2.5		S23 W07				B	10	2	BXO

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MCMATH REGION 15174 (CONT) CMP DATE 6.3

				CALCIUM	PLAGE	DATA			SUNSPOT	DATA					
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	7	15174	S24 W17	92	200	2.0									
78	3	8	15174	S24 W30	91	200	2.5									
78	3	9	15174	S24 W43	92	200	1.5									
78	3	10	15174	S24 W56	92	200	1.5									
78	3	12	15174	S25 W84	92	200	1.0									

MCMATH REGION 15173 CMP DATE 7.7 RETURN OF REGION 15132 ROTATION 3

				CALCIUM	PLAGE	DATA			SUNSPOT	DATA					
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	28	15173	S27 E90	76	500	1.0									
78	3	1	15173	S27 E77	77	300	1.0									
78	3	2	15173	S27 E65	76	200	1.0									
78	3	3	15173	S27 E51	76	400	1.0									
78	3	4	15173	S27 E38	77	600	2.0									
78	3	5	15173	S27 E26	76	800	2.0									
78	3	6	15173	S28 E14	75	700	1.5									
78	3	7	15173	S29 E02	73	400	1.0									
78	3	8	15173	S29 W12	73	400	1.5									
78	3	9	15173	S30 W25	74	300	1.0									
78	3	10	15173	S30 W38	74	300	1.0									
78	3	12	15173	S31 W60	68	300	1.0									

MCMATH REGION 15172 CMP DATE 7.9 RETURN OF REGION 15134 AND 15135 ROTATION 2 & 3

				CALCIUM	PLAGE	DATA			SUNSPOT	DATA					
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	28	15172	N20 E90	76	800	1.0									
78	3	1	15172	N19 E80	74	3000	4.0									
78	3	2	15172	N20 E70	71	6000	3.5									
78	3	3	15172	N20 E56	71	7400	3.5									
78	3	4	15172	N20 E44	71	7400	3.5									
78	3	5	15172	N20 E31	71	7000	3.5		N20 E28			B	380	10	EHI
78	3		15172						N14 E25			B	20	1	HSX
78	3		15172						N27 E33			B	50	1	HSX
78	3	6	15172	N21 E17	72	7000	4.5		N13 E08			B	40	14	DSI
78	3		15172						N21 E08			B	380	21	EHO
78	3		15172						N27 E10			B	50	1	HSX
78	3	7	15172	N21 E05	70	7000	3.5		N25 E10			B	40	3	CSO
78	3		15172						N11 W05			B	60	15	DSO
78	3		15172						N19 W02			B	320	27	EHI
78	3	8	15172	N21 W09	70	8000	3.5		N25 W03			B	40	4	CSO
78	3		15172						N12 W20			B	100	16	DAI
78	3		15172						N18 W18			B	380	14	EHI
78	3	9	15172	N21 W22	71	8000	3.0		N12 W31			B	20	3	DSO
78	3		15172						N19 W29			B	240	2	EHO
78	3		15172						N25 W17			B	40	2	HAX
78	3	10	15172	N21 W35	71	7800	3.5		N12 W48			B	10	2	BXO
78	3		15172						N18 W44			B	340	14	CHI
78	3		15172						N26 W30			B	50	11	DSI
78	3	11	15172						N14 W51			H	30	3	BXO
78	3		15172						N20 W49			H	340	12	CHO
78	3		15172						N27 W35			H	50	10	DRO
78	3	12	15172	N21 W63	71	7500	3.0		N27 W55			B	50	2	CRO
78	3		15172						N21 W68			B	160	1	HKX
78	3	13	15172	N21 W74	70	3200	2.0								
78	3	14	15172	N21 W88	71	1100	1.0								

MCMATH REGION 15175 CMP DATE 11.0 RETURN OF REGION 15139 ROTATION 2

				CALCIUM	PLAGE	DATA			SUNSPOT	DATA					
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	4	15175	N16 E84	31	1700	3.5									
78	3	5	15175	N18 E70	32	2800	3.5		N16 E62			B	240	1	HSX
78	3	6	15175	N18 E57	32	4500	3.5		N16 E47			B	350	3	HHX
78	3	7	15175	N18 E45	30	5000	3.5		N15 E35			B	220	3	HSX
78	3	8	15175	N18 E32	29	5800	3.5		N15 E23			B	290	5	HHX
78	3	9	15175	N18 E19	30	5800	3.5		N15 E11			B	200	1	HHX
78	3	10	15175	N18 E06	30	6000	3.0								
78	3	11	15175						N16 W07			H	270	5	CHO
78	3	12	15175	N18 W23	31	6000	3.0		N16 W28			B	240	3	CHI
78	3	13	15175	N18 W34	30	5300	2.5		N15 W44			B	280	2	CRO
78	3	14	15175	N18 W48	31	5500	2.5		N15 W53			B	100	3	CAO
78	3	15	15175	N18 W62	31	5500	2.5		N14 W66			B	190	1	HAX

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MCMATH REGION 15175 (CONT) CMP DATE 11.0

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	16	15175	N18 W74	31	4800	2.5									
78	3	17	15175	N28 W87	30	1700	1.5									

MCMATH REGION 15177 CMP DATE 13.8

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	7	15177	S03 E85	351	200	1.0									
78	3	8	15177	S02 E72	350	700	3.5		S04 E65				B	0	2	AXX
78	3	9	15177	S02 E58	352	800	3.5		S03 E51				B	30	1	HSX
78	3	10	15177	S02 E44	353	800	3.0		S03 E39				B	90	8	DAO
78	3	12	15177	S02 E15	354	1100	2.5		S02 E14				B	100	8	ORI
78	3	13	15177	S02 E04	353	1300	2.5		S03 W01				B	140	7	ORI
78	3	14	15177	S02 W10	353	1200	2.5		S01 W13				B	50	8	DAO
78	3	15	15177	S02 W26	355	1200	3.0		S01 W29				B	410	3	HAO
78	3	16	15177	S01 W39	356	1200	3.0									
78	3	17	15177	S01 W53	356	1100	3.0	19967	N00 W60	359	X	2				
78	3	18	15177	S01 W66	357	1200	2.5									
78	3	19	15177	S01 W79	358	1200	2.0									

MCMATH REGION 15176 CMP DATE 14.0

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	7	15176	N17 E85	351	2000	2.5		N15 E78				B	300	2	DSO
78	3	8	15176	N17 E73	349	3700	3.5		N15 E65				B	650	7	HKX
78	3	9	15176	N16 E60	350	4600	3.5		N16 E52				B	580	3	HKX
78	3	10	15176	N16 E47	350	5200	3.5		N16 E38				B	600	9	EKI
78	3		15176						N16 E35				H	560	11	DKC
78	3	12	15176	N16 E17	352	5500	3.0		N16 E13				B	500	4	EKC
78	3	13	15176	N16 E06	351	4800	3.0		N14 E03				B	600	6	EKC
78	3	14	15176	N16 W09	352	5200	3.5		N15 W09				B	520	16	EKI
78	3	15	15176	N16 W23	352	5100	3.0		N15 W26				B	120	5	DHO
78	3	16	15176	N16 W35	352	5100	3.0									
78	3	17	15176	N16 W48	351	5100	3.5	19968	N15 W57	356	(AP)	4				
78	3	18	15176	N16 W60	351	5200	3.0		N17 W70				B	360	2	HHX
78	3	19	15176	N16 W70	349	3700	3.0	19968	N15 W79	355	(AP)	3	B	280	1	HHO
78	3	20	15176	N16 W85	349	900	1.5									

MCMATH REGION 15179 CMP DATE 14.4 RETURN OF REGION 15155 ROTATION 2

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	8	15179	N30 E80	342	800	2.0									
78	3	9	15179	N29 E68	342	1500	2.0									
78	3	10	15179	N29 E57	340	1500	2.5									
78	3	12	15179	N28 E24	345	1700	2.5									
78	3	13	15179	N28 E12	345	1400	2.5									
78	3	14	15179	N28 W01	344	1300	2.5									
78	3	15	15179	N28 W15	344	1000	2.5									
78	3	16	15179	N28 W27	344	1000	2.0									
78	3	17	15179	N28 W40	343	1200	2.0									
78	3	18	15179	N28 W52	343	1200	2.5									
78	3	19	15179	N28 W65	344	1300	2.0									
78	3	20	15179	N28 W78	342	600	1.0									

MCMATH REGION 15181 CMP DATE 14.5 RETURN OF PART OF REGION 15142 ROTATION 3

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	8	15181	S28 E85	337	700	1.5									
78	3	9	15181	S30 E70	340	600	2.0									
78	3	10	15181	S29 E55	342	700	2.0									
78	3	12	15181	S29 E28	341	800	2.0		S29 E29				B	20	1	AXX
78	3	13	15181	S28 E13	344	1100	2.5		S29 E16				B	10	2	BXO
78	3	14	15181	S28 E00	343	900	2.0									
78	3	15	15181	S29 W13	342	800	2.0									
78	3	16	15181	S29 W25	342	700	2.0									
78	3	17	15181	S28 W38	341	700	2.0									
78	3	18	15181	S29 W50	341	800	2.0									
78	3	19	15181	S29 W60	339	700	2.0									

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MCMATH REGION 15181 (CONT) CMP DATE 14.5

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H STA	AREA	CNT	CLASS
78	3	20	15181	S30 W70	334	600	1.5								

MCMATH REGION 15178 CMP DATE 16.7

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H STA	AREA	CNT	CLASS
78	3	9	15178	S29 E88	322	2500	3.5								
78	3	10	15178	S30 E80	317	3000	3.5		S29 E74			B	450	4	DSO
78	3		15178						S32 E86			B	300	2	HSX
78	3	11	15178						S30 E70			H	430	6	DHO
78	3		15178						S32 E80			H	280	4	DSO
78	3	12	15178	S30 E50	319	4500	3.0		S29 E46			B	340	8	DHO
78	3		15178						S34 E58			B	380	5	DAI
78	3	13	15178	S30 E38	319	4600	3.0		S27 E34			B	340	8	DHO
78	3		15178						S34 E44			B	220	6	DAI
78	3	14	15178	S30 E26	317	4600	3.0		S28 E21			B	320	2	CHO
78	3		15178						S33 E34			B	200	15	DAI
78	3	15	15178	S31 E13	316	4600	3.5		S29 E08			B	300	3	CHO
78	3		15178						S33 E20			B	280	8	DAI
78	3	16	15178	S31 E02	315	4600	3.5								
78	3	17	15178	S32 W10	313	5000	3.0	19969	S32 W13	312	(B)	4 B	440	9	HSX
78	3	18	15178	S32 W22	313	5000	3.0		S30 W23			B	410	12	FHO
78	3	19	15178	S32 W34	313	4600	3.0	19969	S33 W35	311	(B)	4 B	300	3	FKO
78	3	20	15178	S32 W46	310	4100	3.0		S31 W43			B	210	5	EHO
78	3	21	15178						S32 W58			B	280	9	EHO
78	3	22	15178	S33 W68	306	4100	3.5		S33 W80			B	210	2	FKO
78	3	23	15178	S34 W80	305	3100	3.0		S35 W81			R	250	3	FKO
78	3	24	15178	S34 W88	300	1000	1.0								

MCMATH REGION 15192 CMP DATE 16.8

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H STA	AREA	CNT	CLASS
78	3	20	15192	S16 W50	314	200	1.5								

MCMATH REGION 15189 CMP DATE 17.0

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H STA	AREA	CNT	CLASS
78	3	18	15189	N28 W21	312	100	1.5								

MCMATH REGION 15193 CMP DATE 17.6

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H STA	AREA	CNT	CLASS
78	3	20	15193	N33 W40	304	200	1.0								

MCMATH REGION 15182 CMP DATE 19.1

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H STA	AREA	CNT	CLASS
78	3	14	15182	S07 E59	284	200	2.0								
78	3	15	15182	S07 E44	285	100	1.5								

MCMATH REGION 15194 CMP DATE 19.1

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H STA	AREA	CNT	CLASS
78	3	20	15194	N20 W20	284	200	1.5								
78	3	22	15194	N19 W45	283	200	2.5		N17 W48			B	8	1	AXX
78	3	23	15194	N17 W59	284	200	2.5		N16 W56			R	40	3	CRO
78	3	24	15194	N18 W74	286	200	1.0								

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MCMATH REGION 15196 CMP DATE 19.6

CALCIUM PLAGE DATA							SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	20	15196	S35 W14	278	100	2.0									

MCMATH REGION 15201 CMP DATE 19.6

CALCIUM PLAGE DATA							SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	22	15201	S40 W39	277	500	3.5		S41 W41				B	30	5	DSI
78	3	23	15201	S40 W50	275	1000	4.0	19973	S43 W56	279	B	3	R	120	14	DAO
78	3	24	15201	S42 W64	276	1000	3.5	19973	S42 W65	276	(B)	3	H	120	10	DAO
78	3	25	15201	S42 W75	274	1200	3.5	19973	S42 W75	273	(BP)	4	B	190	3	DAO
78	3	26	15201					19973	S42 W84	269	X	2				

MCMATH REGION 15183 CMP DATE 20.4 RETURN OF REGION 15153 ROTATION 2

CALCIUM PLAGE DATA							SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	14	15183	N31 E77	266	1200	3.5		N31 E73				B	90	1	HSX
78	3	15	15183	N31 E59	270	1700	3.5		N30 E57				B	70	1	HSX
78	3	16	15183	N31 E48	269	1500	3.0									
78	3	17	15183	N32 E36	267	1500	3.5	19970	N31 E31	268	(AP)	4	B	60	2	HAX
78	3	18	15183	N32 E23	268	1400	2.5		N32 E21				B	60	2	CSO
78	3	19	15183	N32 E11	268	1600	2.0	19970	N31 E09	267	(AP)	3	B	40	2	CSO
78	3	20	15183	N32 W02	266	1600	2.0		N30 W02				B	20	2	HSX
78	3	21	15183						N30 W14				B	20	2	HSX
78	3	22	15183	N32 W26	264	1200	2.0		N29 W29				B	20	1	HSX
78	3	23	15183	N33 W36	261	1000	1.5	19970	N30 W40	263	AP	3	R	30	3	HSX
78	3	24	15183	N33 W47	259	600	1.5	19970	N30 W52	263	(AP)	3				
78	3	25	15183	N33 W60	259	600	1.5									

MCMATH REGION 15184 CMP DATE 20.6 RETURN OF REGION 15154 ROTATION 6

CALCIUM PLAGE DATA							SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	14	15184	N19 E82	261	600	4.0									
78	3	15	15184	N19 E65	264	2500	3.0		N18 E64				B	50	3	BXO
78	3	16	15184	N19 E53	264	2400	3.0									
78	3	17	15184	N19 E40	263	2700	3.0	19971	N18 E34	265	(BF)	4	B	40	5	CSO
78	3	18	15184	N19 E27	264	2700	3.5		N18 E24				B	100	13	EAI
78	3	19	15184	N19 E14	265	2300	3.0	19971	N19 E12	264	(Y)	3	B	80	7	CSO
78	3	20	15184	N19 E00	264	2800	3.5		N18 E02				B	70	14	DSI
78	3	21	15184						N18 W12				B	20	16	CSI
78	3	22	15184	N19 W26	264	3200	3.0		N18 W30				B	10	3	BXO
78	3	23	15184	N19 W39	264	2800	3.5		N17 W39				R	30	4	BXO
78	3	24	15184	N19 W54	266	2300	3.5	19979	N18 W54	265	(B)	3				
78	3	25	15184	N19 W67	266	2300	3.5	19979	N18 W66	264	(AP)	3	B	40	2	CRO

MCMATH REGION 15190 CMP DATE 21.5

CALCIUM PLAGE DATA							SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	18	15190	S33 E38	253	300	3.0									
78	3	19	15190	S33 E25	254	400	3.0									
78	3	20	15190	S33 E12	252	300	2.5									
78	3	22	15190	S33 W13	251	200	1.5									
78	3	23	15190	S33 W26	251	200	1.0									
78	3	24	15190	S34 W38	250	200	1.0									

MCMATH REGION 15185 CMP DATE 21.9

CALCIUM PLAGE DATA							SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	15	15185	N27 E85	244	1200	1.0									
78	3	16	15185	N28 E70	247	1400	1.5									
78	3	17	15185	N27 E57	246	1600	2.0									
78	3	18	15185	N27 E45	246	1700	2.0									
78	3	19	15185	N27 E33	246	2000	2.0									
78	3	20	15185	N27 E17	247	1900	2.5									

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MCMATH REGION 15185 (CONT) CMP DATE 21.9

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
78	3	22	15185	N27 W09	247	1700	2.5
78	3	23	15185	N27 W22	247	1600	2.0
78	3	24	15185	N27 W34	246	1600	2.0
78	3	25	15185	N27 W47	246	1200	2.0

SUNSPOT DATA

MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS

MCMATH REGION 15187 CMP DATE 23.2

RETURN OF PART OF REGION 15161 ROTATION 4

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
78	3	17	15187	N23 E80	223	1400	2.0
78	3	18	15187	N22 E63	228	1400	2.5
78	3	19	15187	N22 E50	229	1200	2.5
78	3	20	15187	N22 E34	230	1200	2.5
78	3	21	15187				
78	3	22	15187	N22 E08	230	800	2.0
78	3	23	15187	N23 W06	231	1000	2.0
78	3	24	15187	N23 W18	230	800	2.0
78	3	25	15187	N23 W32	231	800	2.0
78	3	28	15187	N24 W78	234	500	1.0

SUNSPOT DATA

MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
19972	N19 E68	231	(AP)	2	B	30	1	HSX
	N20 E57				B	40	1	HRX
19972	N19 E44	232	(AP)	4	B	50	1	HSO
	N19 E32				B	30	1	HSX
	N19 E20				B	30	1	HSX
	N18 E04				B	20	1	HSX
19972	N19 W07	230	AP	3	R	20	1	HSX
19972	N19 W18	229	(AP)	3				
19972	N18 W32	230	(AP)	2	B	30	1	HSX

MCMATH REGION 15202 CMP DATE 23.8

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
78	3	22	15202	S32 E17	221	200	1.5
78	3	23	15202	S31 E03	222	300	1.5
78	3	24	15202	S31 W08	220	200	2.0
78	3	25	15202	S31 W21	220	200	1.5
78	3	28	15202	S31 W60	216	100	1.0
78	3	29	15202	S32 W70	217	200	1.5

SUNSPOT DATA

MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
	S31 E12				B	20	3	DSO
19974	S32 E02	221	X	1	R	30	4	DRO

MCMATH REGION 15188 CMP DATE 24.8

RETURN OF PART OF REGION 15161 ROTATION 4

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
78	3	18	15188	N25 E83	208	900	1.5
78	3	19	15188	N25 E70	209	1600	2.0
78	3	20	15188	N25 E55	209	1800	2.5
78	3	22	15188	N25 E28	210	1400	2.5
78	3	23	15188	N25 E16	209	1600	2.0
78	3	24	15188	N25 E03	209	1500	2.0
78	3	25	15188	N25 W10	209	1400	2.0
78	3	28	15188	N25 W52	208	1300	1.5
78	3	29	15188	N25 W60	207	1200	1.5
78	3	30	15188	N25 W73	205	1200	1.5
78	3	31	15188	N25 W86	205	400	1.0

SUNSPOT DATA

MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS

MCMATH REGION 15212 CMP DATE 25.4

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
78	3	28	15212	S52 W45	201	100	1.5
78	3	29	15212	S52 W55	202	100	2.5

SUNSPOT DATA

MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS

MCMATH REGION 15191 CMP DATE 25.8

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
78	3	18	15191	S30 E81	210	400	1.0
78	3	19	15191	S30 E75	204	500	2.0
78	3	20	15191	S30 E61	203	500	1.5
78	3	22	15191	S30 E43	195	200	1.0
78	3	23	15191	S30 E29	196	400	2.0
78	3	24	15191	S30 E16	19[illegible]	800	2.0
78	3	25	15191	S30 E03	19[illegible]	800	2.0
78	3	26	15191				
78	3	27	15191				
78	3	28	15191				

(Con't)

SUNSPOT DATA

MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
19980	S33 E19	192	(B)	2	H	20	6	BXO
19981	S31 W03	201	(AF)	2	B	10	1	AXX
19980	S33 W05	190	(B)	3	B	20	11	DSO
19980	S32 W20	191	(BP)	3	B	80	13	DAI
19980	S30 W35	193	(B)	4	B	140	15	DAI

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MCMATH REGION 15191 (CONT) CMP DATE 25.8

				CALCIUM PLAGE DATA				SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	29	15191					19980	S30 W50	195	(BP)	4	B	130	5	EHO

MCMATH REGION 15211 CMP DATE 26.1

				CALCIUM PLAGE DATA				SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	28	15211	S32 W35	191	1800	3.5									
78	3	29	15211	S32 W45	192	1800	3.0									
78	3	30	15211	S33 W59	191	1800	3.0									
78	3	31	15211	S32 W73	192	1800	3.0		S27 W78				B	30	1	HSX
78	4	01	15211	S32 W83		1800	3.0									

MCMATH REGION 15197 CMP DATE 26.5

				CALCIUM PLAGE DATA				SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	20	15197	N22 E32	182	500	1.5									
78	3	22	15197	N20 E52	186	200	2.0									
78	3	23	15197	N20 E39	186	200	1.5									
78	3	24	15197	N20 E27	185	300	2.0									
78	3	25	15197	N20 E14	185	200	2.0									
78	3	28	15197	N21 W30	186	200	2.0									
78	3	29	15197	N22 W40	187	200	2.0									
78	3	30	15197	N21 W54	186	200	1.5									
78	3	31	15197	N21 W67	186	200	1.0									

MCMATH REGION 15200 CMP DATE 26.6 RETURN OF REGION 15163 ROTATION 2

				CALCIUM PLAGE DATA				SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	19	15200	S18 E90	189	500	1.0									
78	3	20	15200	S20 E78	186	1600	1.5		S24 E79				B	50	1	HSX
78	3	22	15200	S19 E52	186	1000	1.5		S22 E54				B	20	1	HSX
78	3	23	15200	S18 E37	188	1000	2.0	19975	S23 E41	182	AP	3	R	30	2	HSX
78	3	24	15200	S18 E25	187	800	1.5	19975	S23 E29	182	(AP)	3				
78	3	25	15200	S19 E13	186	800	1.5	19975	S23 E16	182	(AP)	3	B	30	1	HSX
78	3	26	15200					19975	S23 E03	182	(AP)	3	B	10	3	HSX
78	3	28	15200	S19 W30	186	600	2.0									
78	3	29	15200	S20 W40	187	900	2.0		S21 W34				B	10	1	AXX
78	3	30	15200	S21 W54	186	800	2.0									
78	3	31	15200	S20 W68	187	700	1.0									

MCMATH REGION 15198 CMP DATE 27.2 RETURN OF REGION 15165 AND 15167 ROTATION 2

				CALCIUM PLAGE DATA				SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	20	15198	N15 E84	180	400	1.5									
78	3	21	15198						N15 E74				B	110	3	DSO
78	3	22	15198	N15 E63	175	1500	3.0		N15 E55				B	100	3	DSO
78	3	23	15198	N16 E46	179	1600	3.0	19977	N16 E47	176	AP	3	R	90	6	DAO
78	3		15198					19976	N15 E40	183	AP	3				
78	3	24	15198	N16 E35	177	1500	3.0	19977	N16 E35	176	(AP)	3	H	80	5	DSO
78	3		15198					19976	N15 E28	183	(AP)	4				
78	3	25	15198	N17 E22	177	1700	3.0	19977	N15 E21	177	(AP)	2	B	90	5	ESO
78	3		15198					19976	N14 E15	183	(AP)	4				
78	3	26	15198					19977	N15 E10	175	(BF)	3	B	40	9	ESO
78	3		15198					19976	N14 E02	183	(AP)	4				
78	3	27	15198					19977	N16 E02	169	(AF)	2				
78	3		15198					19976	N14 W13	184	(AP)	3	B	20	3	BXO
78	3	28	15198	N17 W21	177	1400	2.5									
78	3		15198					19976	N13 W26	184	(AP)	3	B	0	1	AXX
78	3	29	15198	N17 W30	177	1400	2.5	19977	N15 W28	173	AP	1				
78	3		15198					19976	N13 W39	184	(AP)	3	B	10	1	AXX
78	3	30	15198	N17 W45	177	1400	2.5									
78	3	31	15198	N17 W59	178	1200	2.0									
78	4	01	15198	N17 W70		1000	2.0									
78	4	02	15198	N17 W84		500	1.0									

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MCMATH REGION 15204 CMP DATE 27.5 RETURN OF REGION 15169 ROTATION 4

				CALCIUM	PLAGE	DATA			SUNSPOT	DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	22	15204	S16 E65	173	400	1.5									
78	3	23	15204	S16 E53	172	400	1.5									
78	3	24	15204	S16 E41	171	300	1.5									
78	3	25	15204	S17 E26	173	300	2.0									
78	3	28	15204	S18 W17	173	200	1.5									
78	3	29	15204	S18 W27	174	400	1.5									
78	3	30	15204	S19 W42	174	300	1.5									
78	3	31	15204	S19 W56	175	300	1.0									
78	4	01	15204	S19 W68		300	1.0									

MCMATH REGION 15203 CMP DATE 27.6 RETURN OF REGION 15162 ROTATION 3

				CALCIUM	PLAGE	DATA			SUNSPOT	DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	21	15203						N37 E78				B	70	2	HSX
78	3	22	15203	N38 E66	172	900	3.0		N36 E60				B	50	2	HSX
78	3	23	15203	N37 E50	175	2100	3.5	19978	N37 E48	175	AP	2	R	80	5	DAO
78	3	24	15203	N37 E36	176	2300	3.5	19978	N38 E37	174	(AP)	3	H	60	4	DSO
78	3	25	15203	N37 E25	174	2300	3.0	19978	N38 E25	173	(Y)	3	B	100	5	DRO
78	3	26	15203					19978	N38 E13	172	(AP)	3	B	20	7	CSO
78	3	27	15203					19978	N38 E05	166	(AP)	2	B	10	2	BXO
78	3	28	15203	N37 W16	172	1800	2.5									
78	3	29	15203	N37 W26	173	1400	2.5									
78	3	30	15203	N37 W39	171	1600	2.5									
78	3	31	15203	N37 W52	171	1400	3.0									
78	4	01	15203	N37 W62		1100	2.0									
78	4	02	15203	N37 W75		1000	2.0									

MCMATH REGION 15206 CMP DATE 28.6 RETURN OF PART OF REGION 15166 ROTATION 3

				CALCIUM	PLAGE	DATA			SUNSPOT	DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	22	15206	S20 E80	158	200	1.0									
78	3	23	15206	S18 E65	160	500	1.5									
78	3	24	15206	S18 E52	160	400	2.0									
78	3	25	15206	S19 E39	160	300	2.0									
78	3	27	15206					19982	S19 E12	159	(AP)	2	B	10	3	BXO
78	3	28	15206	S19 W02	158	200	2.0	19982	S19 W02	160	(AP)	2	B	10	2	BXO
78	3	29	15206	S20 W12	159	300	2.0	19982	S18 W16	161	(AP)	3	B	10	1	AXX
78	3	30	15206	S20 W27	159	300	2.0									
78	3	31	15206	S20 W41	160	300	2.0									
78	4	01	15206	S20 W53		300	2.0									
78	4	02	15206	S19 W66		300	2.0									

MCMATH REGION 15207 CMP DATE 28.7

				CALCIUM	PLAGE	DATA			SUNSPOT	DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	24	15207	N45 E50	162	300	1.0									
78	3	25	15207	N45 E42	157	300	1.5									
78	3	28	15207	N45 W01	157	200	1.5									
78	3	29	15207	N45 W10	157	200	1.0									
78	3	30	15207	N45 W23	155	200	1.0									
78	3	31	15207	N45 W36	155	200	1.0									
78	4	01	15207	N45 W46		200	1.0									
78	4	02	15207	N45 W59		100	1.0									

MCMATH REGION 15222 CMP DATE 29.0

				CALCIUM	PLAGE	DATA			SUNSPOT	DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	01	15222	S06 W46		100	1.5									
78	4	02	15222	S05 W60		100	1.0									

REGIONS OF SOLAR ACTIVITY

MARCH 1978

MCMATH REGION 15223 CMP DATE 29.8

				CALCIUM	PLAGE	DATA			SUNSPOT	DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	NW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	31	15223	N28 W19		300	2.0									
78	4	01	15223	N27 W39		300	2.5		N27 W43							
78	4	02	15223	N27 W51		500	2.0		N24 W57				B	10	2	C
78	4	03	15223						N25 W74				B	20	3	B
78	4	04	15223	N27 W78		500	1.5									

MCMATH REGION 15205 CMP DATE 29.8 RETURN OF PART OF REGION 15166 ROTATION 3

				CALCIUM	PLAGE	DATA			SUNSPOT	DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	NW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	22	15205	S26 E88	150	800	1.0									
78	3	23	15205	S27 E50	145	1800	2.5									
78	3	24	15205	S27 E68	144	2200	2.5									
78	3	25	15205	S27 E56	143	2500	2.5									
78	3	27	15205					19983	S25 E24	147	(AP)	2				
78	3	28	15205	S27 E13	143	2000	2.5	19983	S25 E11	147	(AP)	3	B	10	4	BXO
78	3		15205					19984	S27 E01	157	(AP)	3	B	0	1	AXX
78	3	29	15205	S28 E03	144	2200	3.0									
78	3	30	15205	S28 W10	142	2200	3.0									
78	3	31	15205	S28 W23	142	2200	2.5									
78	4	01	15205	S28 W34		2200	2.5									
78	4	02	15205	S28 W48		2300	2.5									
78	4	04	15205	S28 W73		1900	2.0									
78	4	05	15205	S30 W85		400	1.0									

MCMATH REGION 15210 CMP DATE 30.0 RETURN OF REGION 15168 ROTATION 4

				CALCIUM	PLAGE	DATA			SUNSPOT	DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	NW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	24	15210	N26 E70	142	800	1.0									
78	3	25	15210	N25 E60	139	1600	1.5									
78	3	28	15210	N25 E16	140	1200	1.5									
78	3	29	15210	N25 E06	141	1400	1.5									
78	3	30	15210	N25 W08	140	1200	1.5									
78	3	31	15210	N25 W21	140	1000	1.0									
78	4	01	15210	N25 W31		900	1.5	19988	N25 W40		(X)	1				
78	4	02	15210	N25 W44		700	1.0									
78	4	04	15210	N25 W70		600	1.0									

MCMATH REGION 15218 CMP DATE 30.2

				CALCIUM	PLAGE	DATA			SUNSPOT	DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	NW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	30	15218	N13 W06	138	100	2.0									
78	3	31	15218	N13 W20	139	100	1.5									
78	4	01	15218	N13 W31		100	1.5	19989	N13 W31		(X)	1	B	10	4	B
78	4	02	15218	N13 W46		300	2.0									
78	4	04	15218	N13 W73		200	1.0									

MCMATH REGION 15208 CMP DATE 30.3

				CALCIUM	PLAGE	DATA			SUNSPOT	DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	NW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	24	15208	N35 E86	126	400	1.0									
78	3	25	15208	N35 E67	132	200	1.5									
78	3	28	15208	N36 E22	134	200	1.5									
78	3	29	15208	N36 E11	136	100	1.5									
78	3	30	15208	N36 W03	135	100	1.5									
78	3	31	15208	N36 W16	135	100	1.0									

MCMATH REGION 15226 CMP DATE 30.5

				CALCIUM	PLAGE	DATA			SUNSPOT	DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	NW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	04	15226	N13 W64		1000	3.0		N13 W67				B	20	3	B
78	4	05	15226	N13 W78		700	3.0									

DAILY CALCIUM PLAGE INDEX

MARCH 1978

YR	MO	DAY	INDEX	YR	MO	DAY	INDEX	YR	MO	DAY	INDEX
78	3	1	34.2	78	3	11	*	78	3	21	*
78	3	2	34.4	78	3	12	54.6	78	3	22	28.1
78	3	3	34.4	78	3	13	43.5	78	3	23	29.4
78	3	4	35.7	78	3	14	45.0	78	3	24	27.2
78	3	5	36.1	78	3	15	44.9	78	3	25	26.9
78	3	6	44.6	78	3	16	41.0	78	3	26	*
78	3	7	38.7	78	3	17	39.5	78	3	27	*
78	3	8	47.9	78	3	18	37.5	78	3	28	21.7
78	3	9	49.5	78	3	19	30.6	78	3	29	23.4
78	3	10	55.1	78	3	20	30.2	78	3	30	24.1
								78	3	31	21.3

* NO OBSERVATIONS

Note: No calcium spectroheliograms were secured at the McMath-Hulbert Observatory on March 11, 21, 26 and 27, 1978. No sunspot observations were made at Mt. Wilson on March 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 20, 21, 22, 30 and 31, 1978.

SUDDEN IONOSPHERIC DISTURBANCES

MARCH 1978

DAY	UNIVERSAL TIME START	END	MAX	IMP	WIDE SPREAD INDEX	NUMBER OF STATION REPORTS BY TYPE SWF	SCNA	SEA	SPA	LF-SPA	SES	SFD	KNOWN FLARE	McMATH REGION
01	1816	1901	1821	1-	1				1				1816	15170
02	0327	0408D	0332	1-	1				1				0325	X-RAY
02	0400	0440	0405	1-	1				1				0401	15172
02	1828	1855	1833	1	5	2			2	1	10		1829	X-RAY
02	2205	2315	2219	1+	5	1			2		6		NF	
02	2328	0030	2332	1-	5	1			2		4		2328	15162
03	1240	1435	1255	1	3	1			2		1		NF	
03	1738	1830	1743	1-	2				1		10		NF	
03	1836	1900D	1900	1	5						5		*	
03	1917	2020	1934	1	5	1			1		9		1925E	15172
03	2202	2236	2208	1-	3				1		1		2202	X-RAY
04	0031	0234D	0058	1	5	1		1	1		1		0046	15172
04	0141E	0233D	0158	1-	1				1				*	
04	0234E	0423	0253	1	3	1		1	1		1		0233	X-RAY
04	1220	1520	1307	1+	5			2	2		1		1215	15172
04	1545	1620	1550	1-	5	2		1	2	1	13		1540	15162
04	1748	1840	1801	1-	3	1				1	2		1743	15172
05	0028	0112	0035	1-	1				1				0029	X-RAY
05	2002	2022D	2007	1-	3						4		1950	X-RAY
05	2023	2052	2028	1-	5						8		2010	X-RAY
06	0148	0304	0200	1-	1				1				0149	15172
06	1130	1500	1215	2-	5	2		4	2		1		1127	15172
06	1355	1429	1407	1-	1			1					1343E	15172
06	1826	1855	1830	1-	3						7		NF	
07	1158	1315	1216	1	3			2	1				1204	15175
07	2214	2252	2228	1-	5				2	1	5		NF	
08	0102	0130	0108	1-	1				1				0058	15172
09	1051	1137	1102	1-	5			1	3				NF	
09	1204	1245	1211	1-	5				3		1		1201	X-RAY
09	1840	1945	1848	1-	5	3	1		1		12		1840	15178
10	0218	0235	0222	1-	1				1				0216	X-RAY
10	0755	0815	0757	1-	3				1		1		0753	15178
10	1051	1210	1103	1+	5	2		3	3		2		1053	15178
10	2214	2252	2219	1-	1				1				2211	X-RAY
11	0735	0820	0739	1-	1						1		0735	15181
11	1914	1940	1918	1-	5						8		*	
13	0222	0256	-238	1-	1					1			0224	15172
13	1400	1530	1418	1-	5			3	2		1		1356	15172
13	2326	0046	0100	1-	1				1				2328	15175
14	0003E	0134	0024	1-	1				1				0001	15172
14	0340	0530	0348	1	3	1		1	1		1		0340E	15178
14	0835E	1144	0857	1+	1				1				0835	15178
14	2148	2241	2230	1-	3				1		3		*	
15	0435	0518	0452	1	3	1			1				0440	15184
15	0550	0622	0554	1-	1				1				0545	X-RAY
15	1006	1100	1025	1-	5	1		3	3		2		1002	X-RAY
15	1028	1200	1030	1-	1				1				1024E	15184
15	1243	1400	1254	1	5	2		3	3		2		1235E	15175
17	1545	1630	1557	1-	5	1		2	2	1	9		1540E	15185
18	0340	0522	0351	1	3	1			1				0340	15184
18	0606	0703	0616	1-	1				1				*	
20	0700	0757	0710	1-	1				1				0710E	15188
21	0021	0057	0030	1-	1				1				0021	15198
21	0742	0805	0750	1-	3				2				0739	X-RAY
21	0952	1005	0955	1-	1				1				0950	X-RAY
21	1047	1102	1054	1	3			3	1				*	
21	2157	2230	2204	1-	3				1		3		2204E	15187
22	0421	0505	0425	1-	3	1			1				0419	X-RAY
22	1153	1230	1159	1-	3				3		2		1146	15203
22	1310	1400	1323	1-	3			2	2		2		1310	15184
24	2317	0103	2327	1-	5	1			1		6		2314E	15184
26	1428	1452	1439	1	1	1							*	
26	1544U	1640	1601	1	1			1					*	
26	1659	1800	1707	1	1	1							*	
26	1808	1855	1815	1	1	1							*	
26	2052	2113	2054	1	1	1							*	

SUDDEN IONOSPHERIC DISTURBANCES

MARCH 1978

PERIODS OF NO OBSERVATIONS

DATE	TIME (UT) and STATION
01-07	0000-2400 A26
09-28	0000-0600 A5
10-19	0000-2400 A28
11-13	0325-0653 MC
12	1000-1855 UM (13 kHz), 1000-1855 UM (16 kHz)
15	1407-1425 UM (16 kHz)
20	1000-1300 UM (13 kHz), 1908-1918 TM
21	0326-0655 UM (13 kHz), 1010-1352 UM (16 kHz)
22	0520-0658 UM (13 kHz)
23	0000-2400 A45
24	0000-2400 A30, 2008-2018 TM
28	2023-2115 UM (13 kHz)
30	0854-1018 TM
31	1435-1600 UM (13 kHz), 1435-1600 UM (16 kHz)

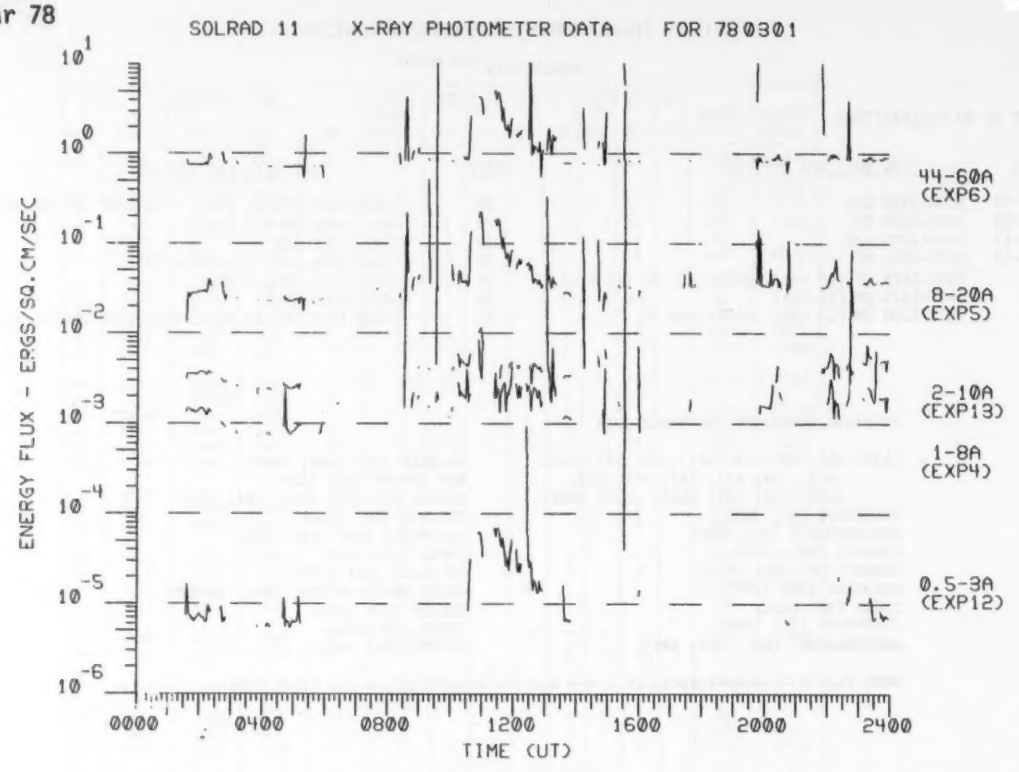
STATIONS REPORTING FOR MARCH 1978

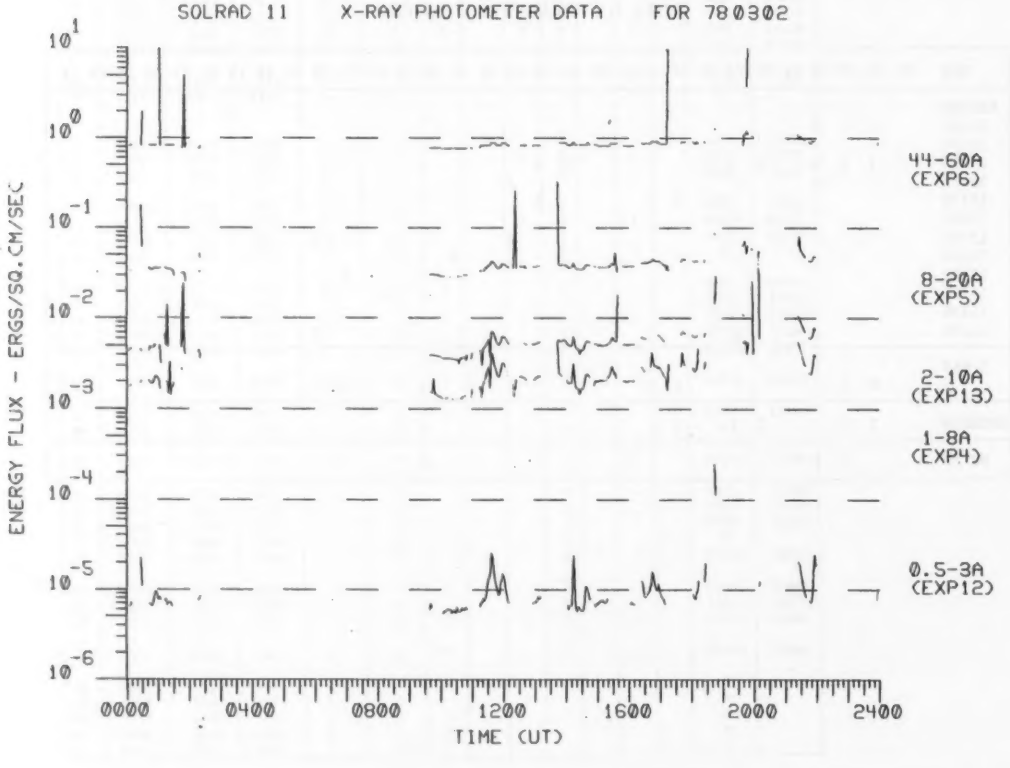
AAVSO (A1, A5, A19, A21, A26, A28, A30, A31, A34, A35, A37, A40, A45) (SES) (A1, A31) (SEA) (A31) (SWF)
DARMSTADT (DA) (SWF)
HERSTMONCEUX (HC) (SEA)
HIRAISO (HI) (SWF)
HOBART (TA) (SEA, SES)
HUANCAYO (HU) (SWF)
INUBO (IN) (SPA)
JULIUSRUH (JL) (SWF)
KUHLUNGSBORN (KU) (SEA, SPA)
MC MATH (MC) (SWF, SCNA)
NEW JERSEY (NJ) (SES)
PANSKA VES (PU) (SWF, SEA, SES)
PRESTON (LO) (SEA)
SAO PAULO (UM) (SES, SPA)
SOFIA (SF) (SES)
ST CLOUD (SC) (SES)
TABLE MOUNTAIN (TM) (SPA, LF-SPA)
TORINO (TN) (SPA)
UPICE (UI) (SEA)
VSETIN (VS) (SEA)

NOTE: Vsetin, Czechoslovakia is a new station reporting for the first time.

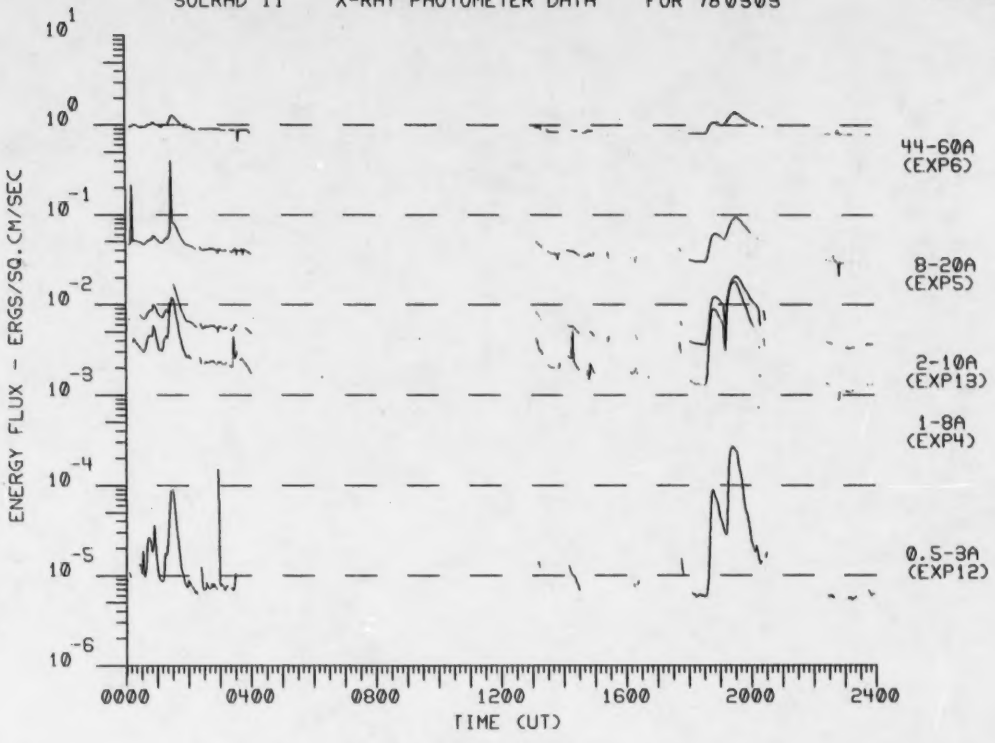
SID's BY McMATH REGION

DAY	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	28	30	31
REGION																															
15162		1		1																											
15170	1																														
15172		1	1	3		3		1					3	1																	
15175							1								1																
15178									1	2				2																	
15181											1																				
15184															2			1				1		1							
15185																	1														
15187																					1										
15188																				1											
15198																					1										
15203																						1									
X-RAY		2	1	3					1	2					2						2	1									
UNKNOWN		1	2			1	1		1																						
NO FP			1	1							1			1				1			1						5			

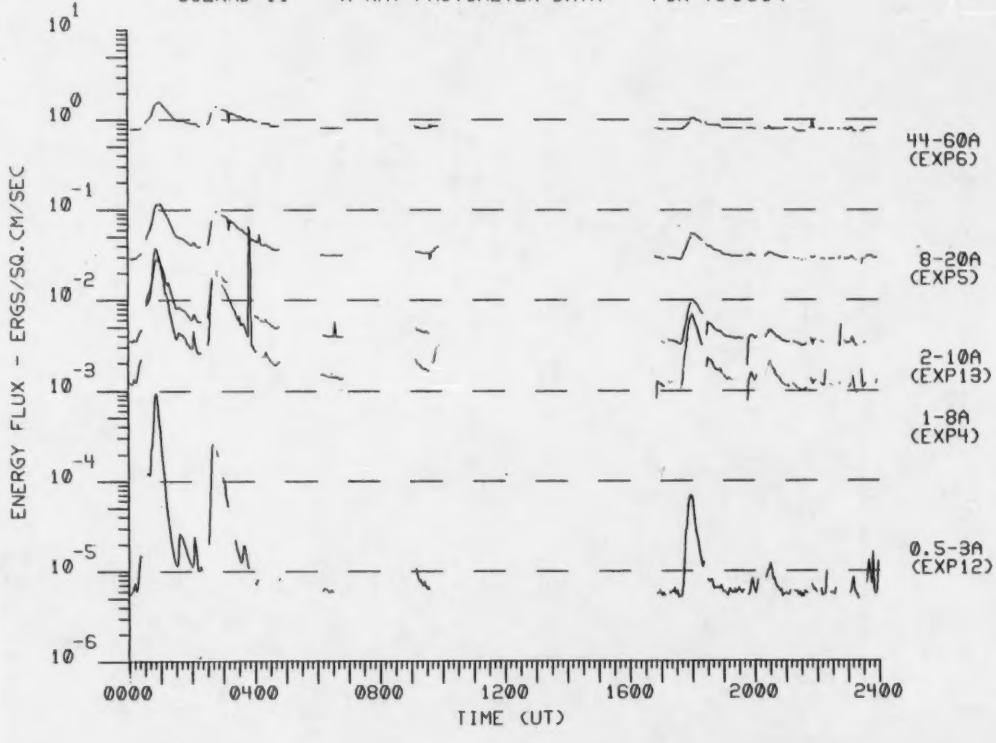

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780301
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780302
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

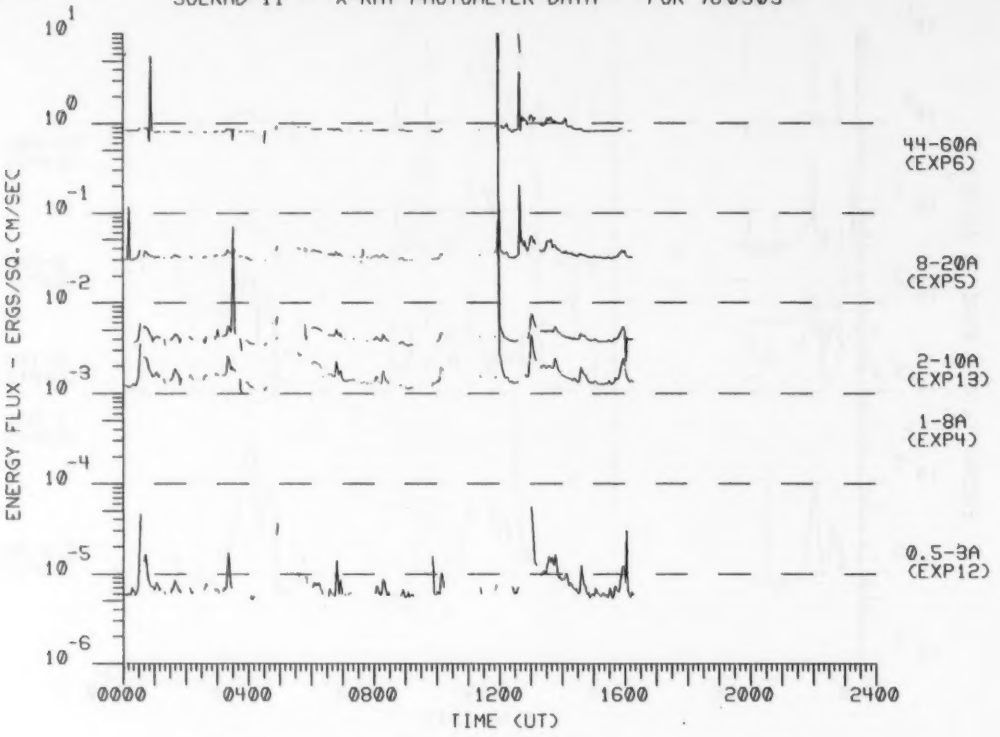
SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780303



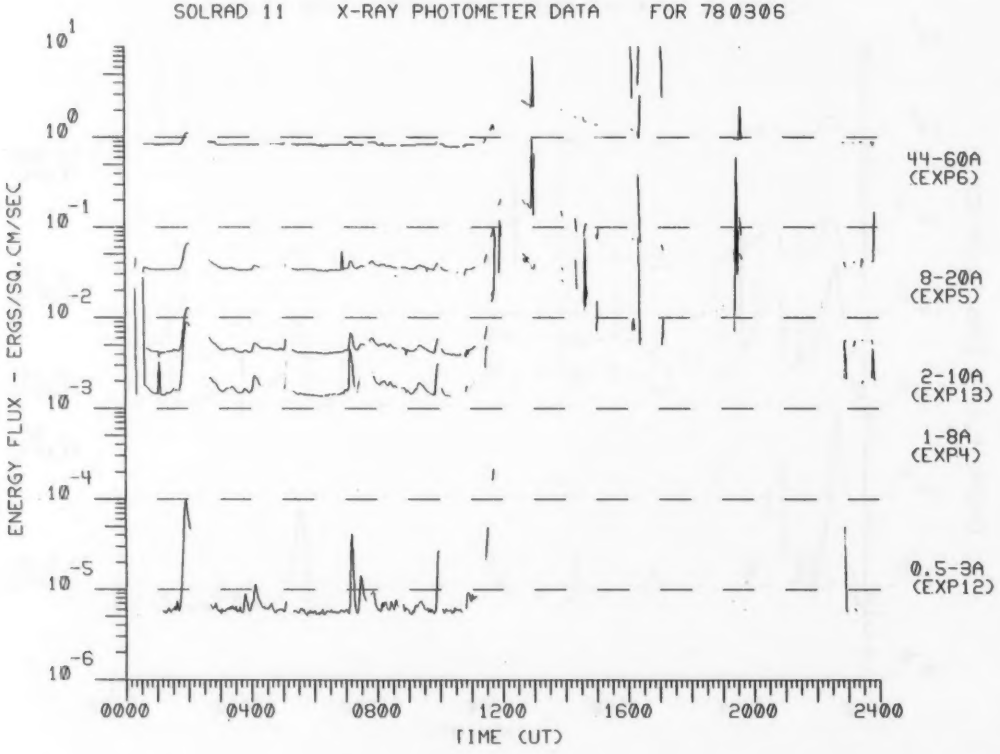
SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780304

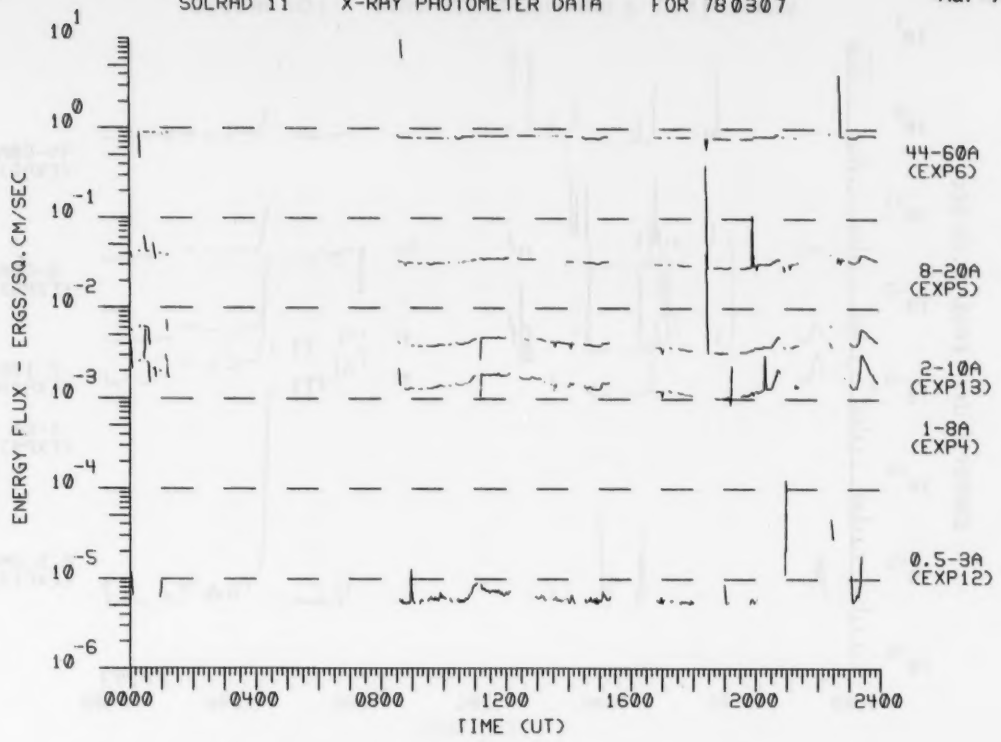


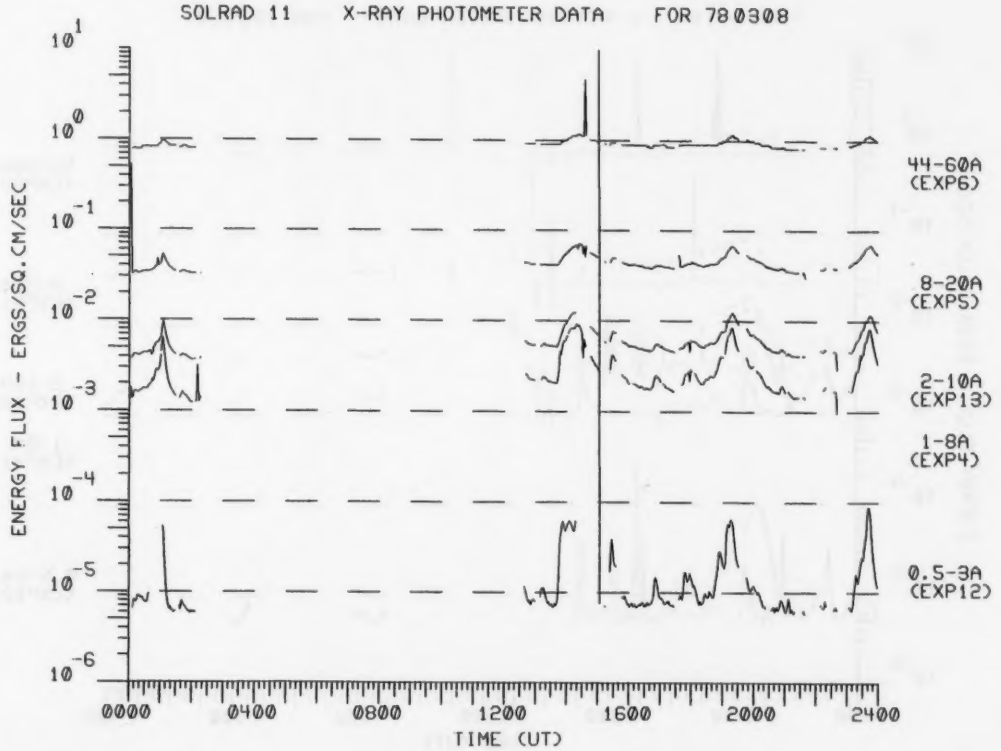
SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780305

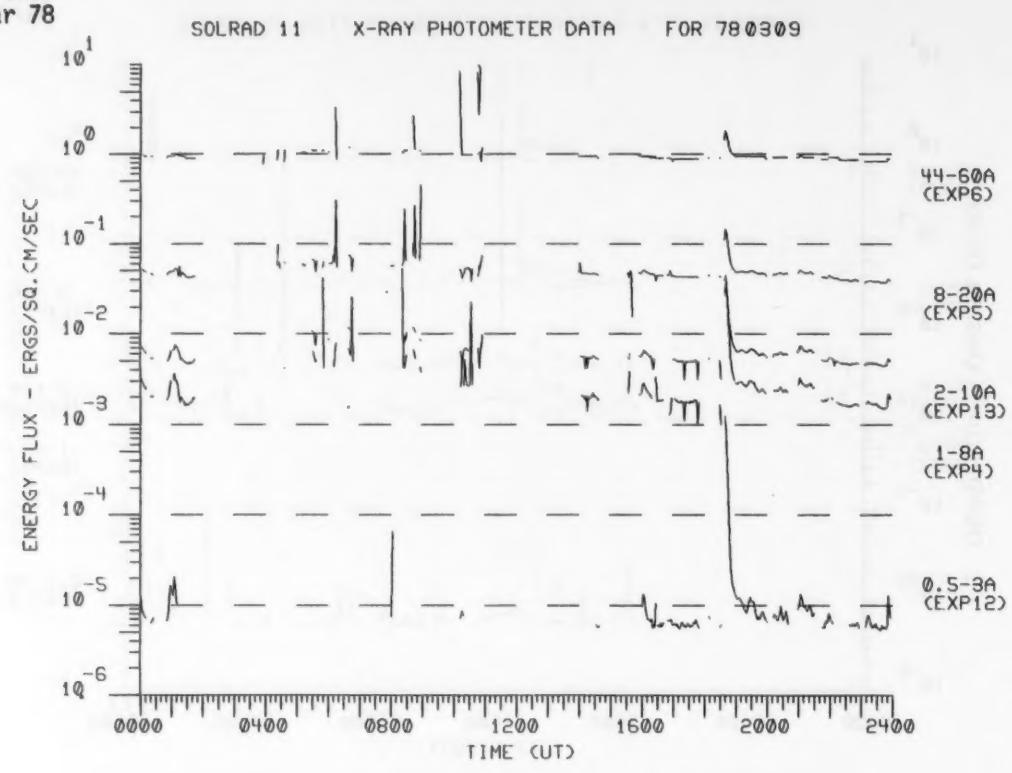


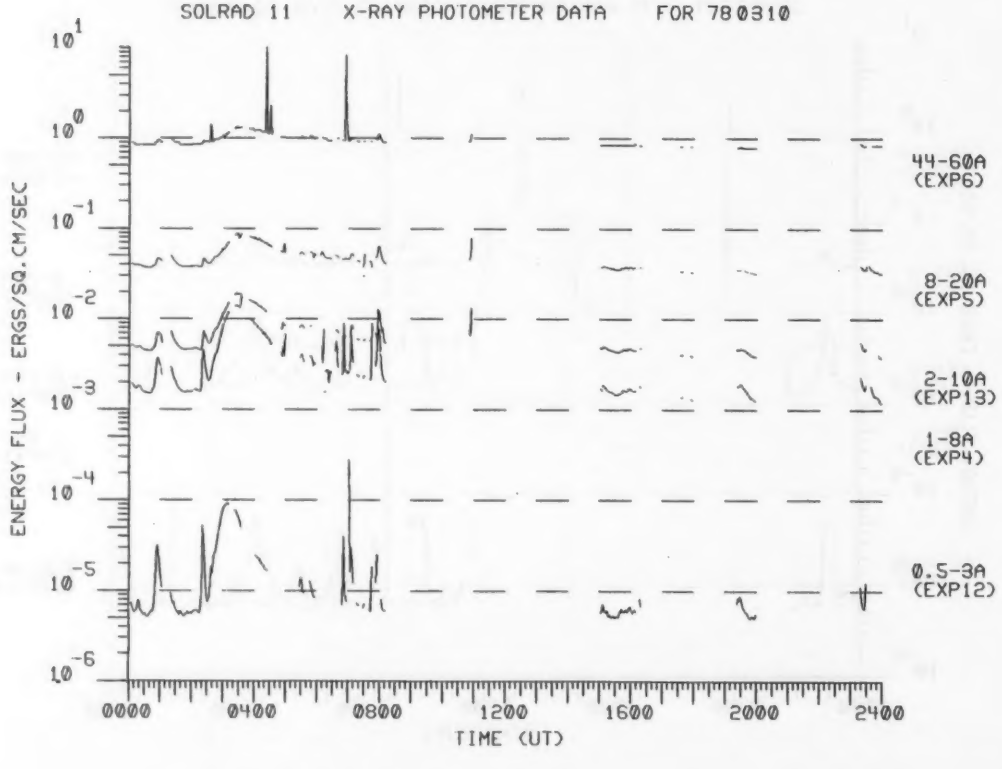
SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780306

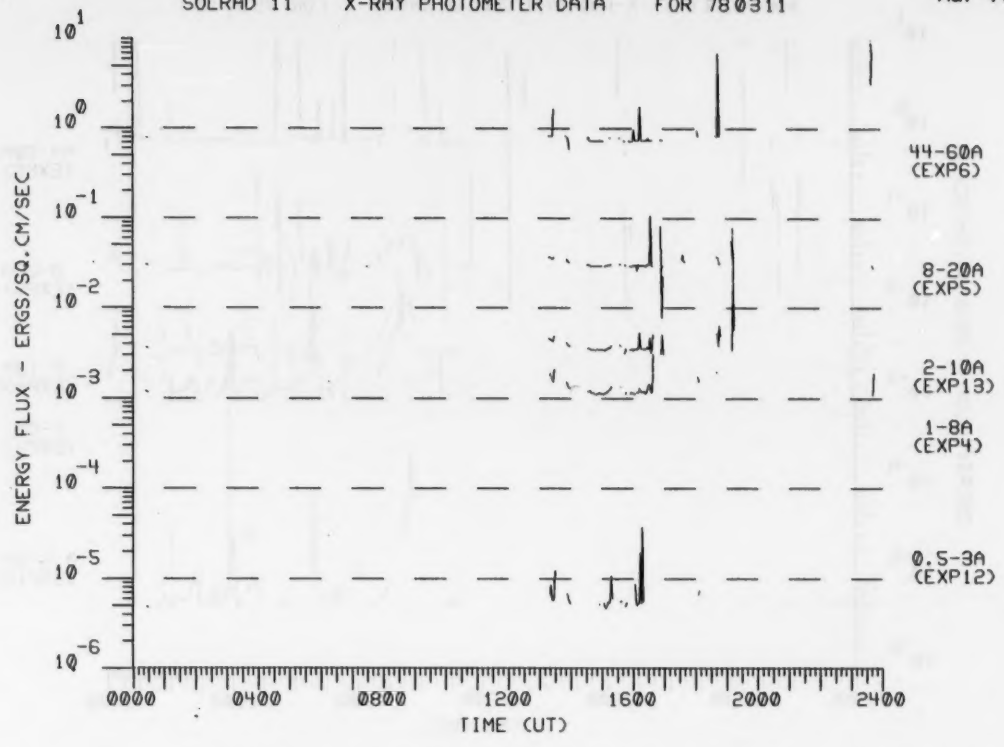


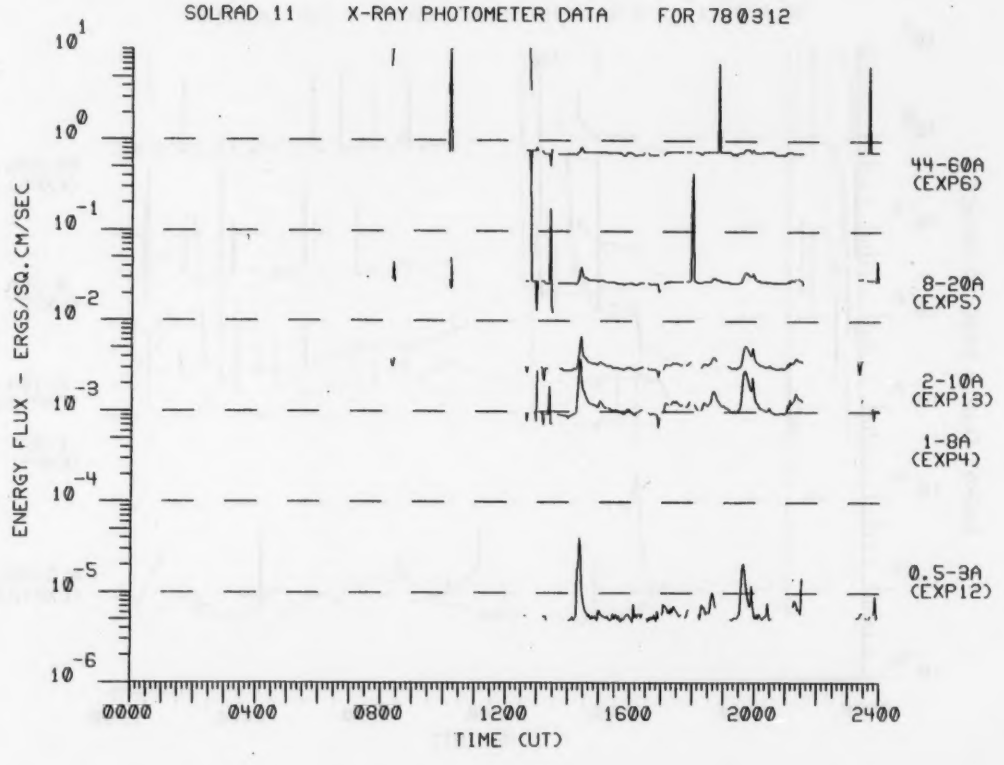

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780307
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

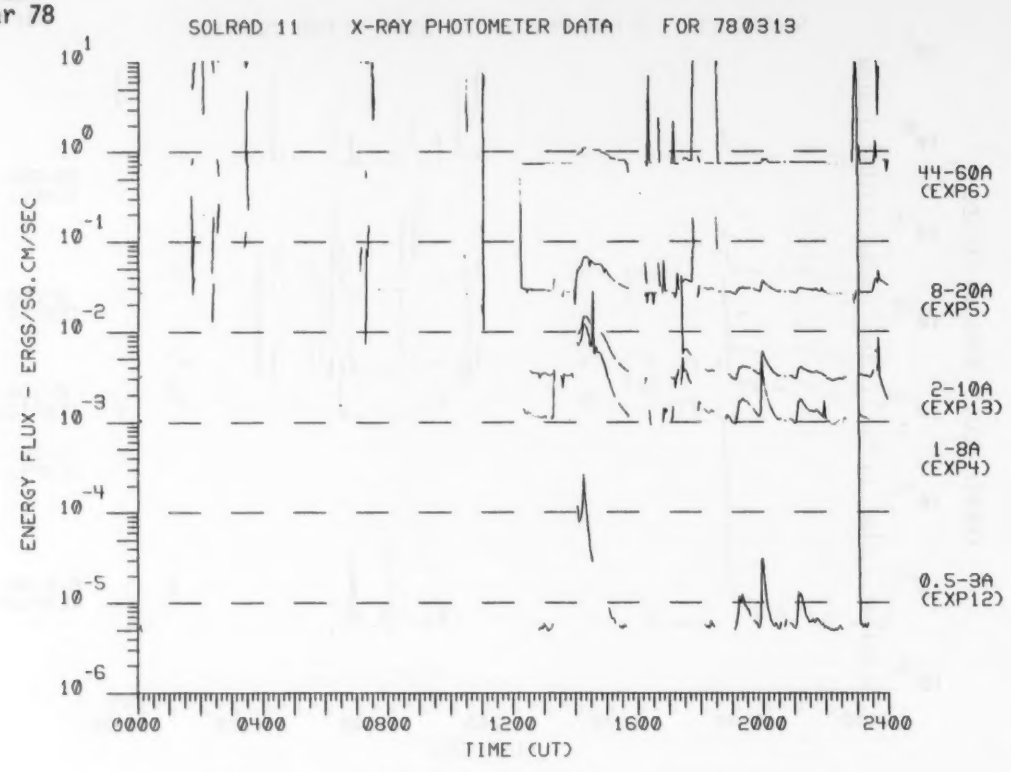

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780308
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

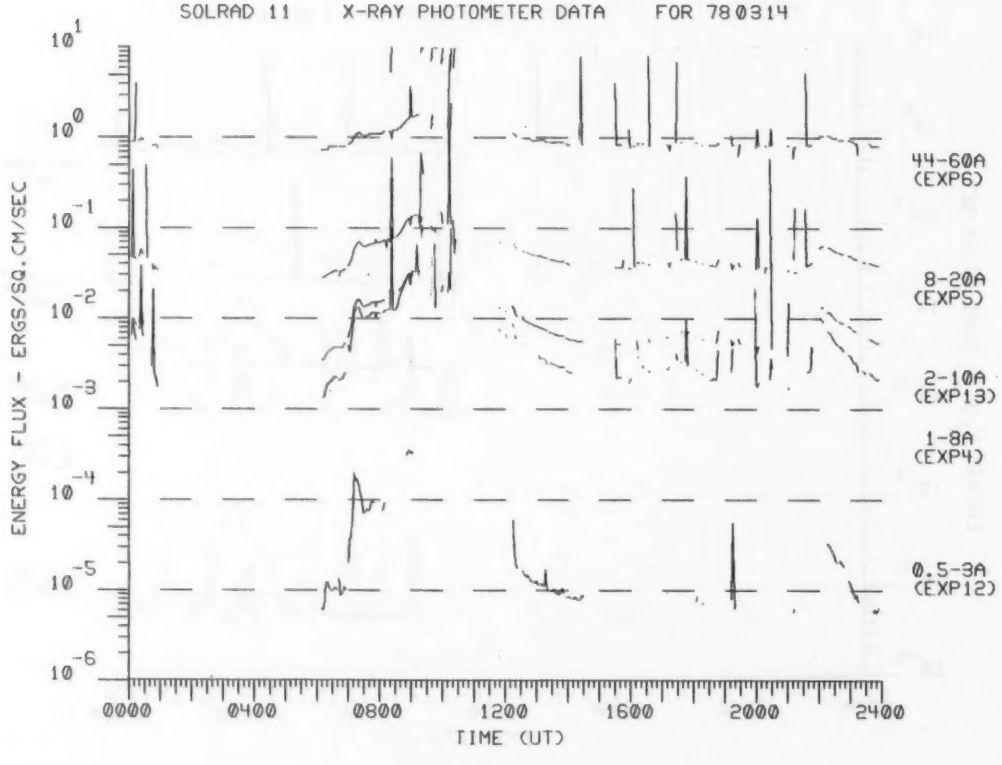

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780309
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

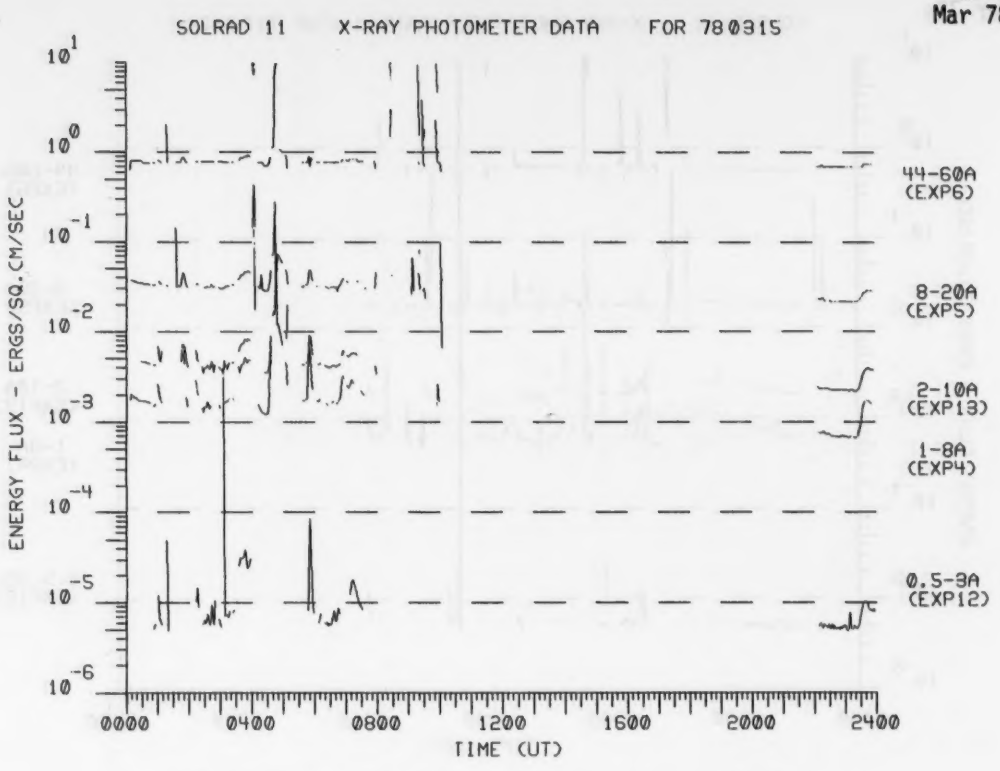

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780310
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

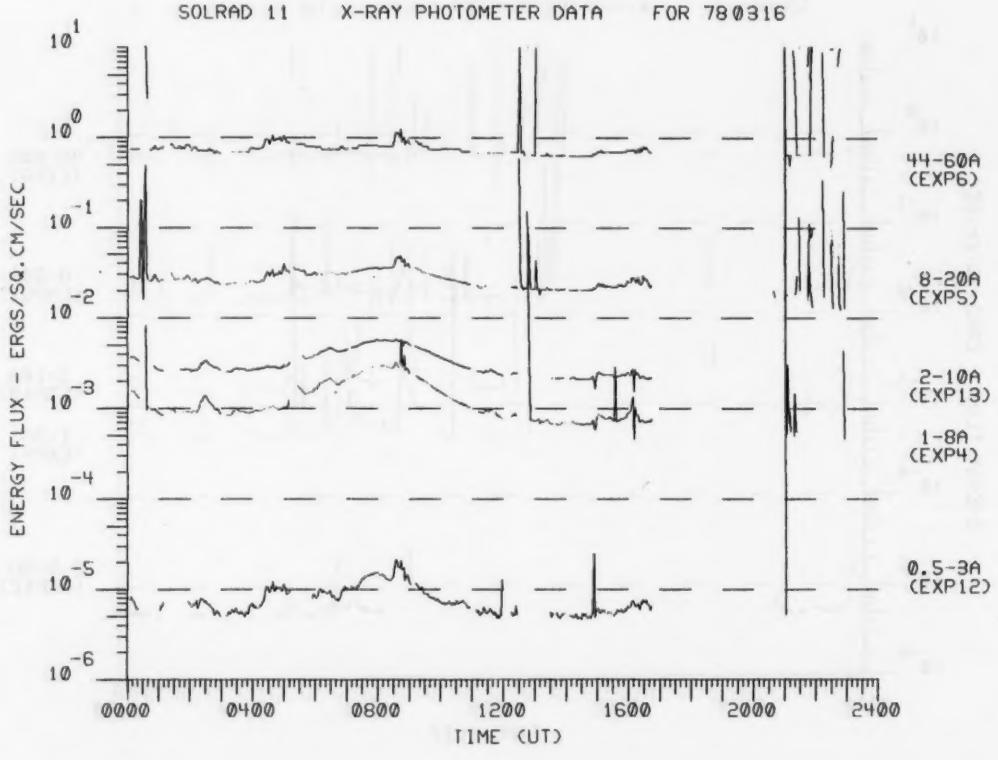

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780311
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780312
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

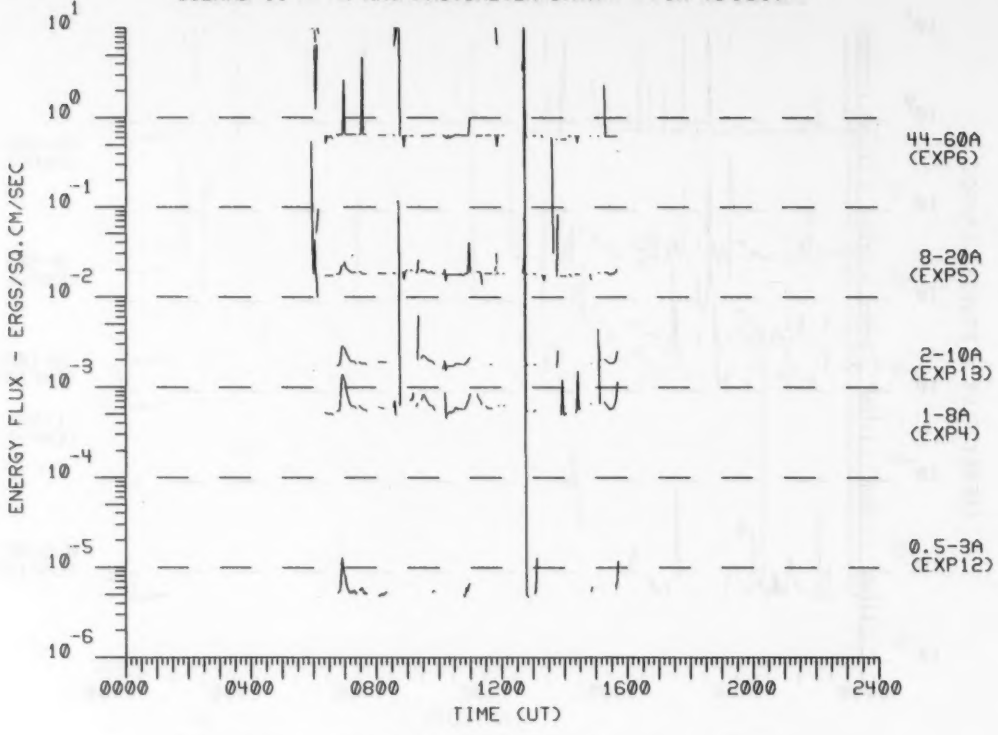

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780313
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780314
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

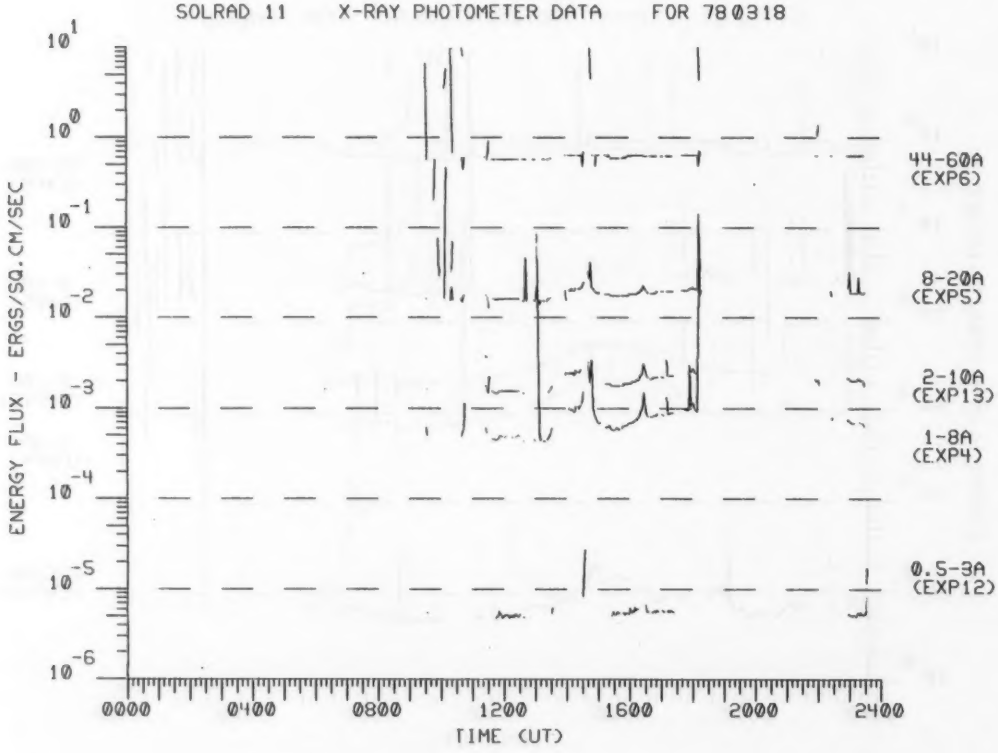

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780315
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

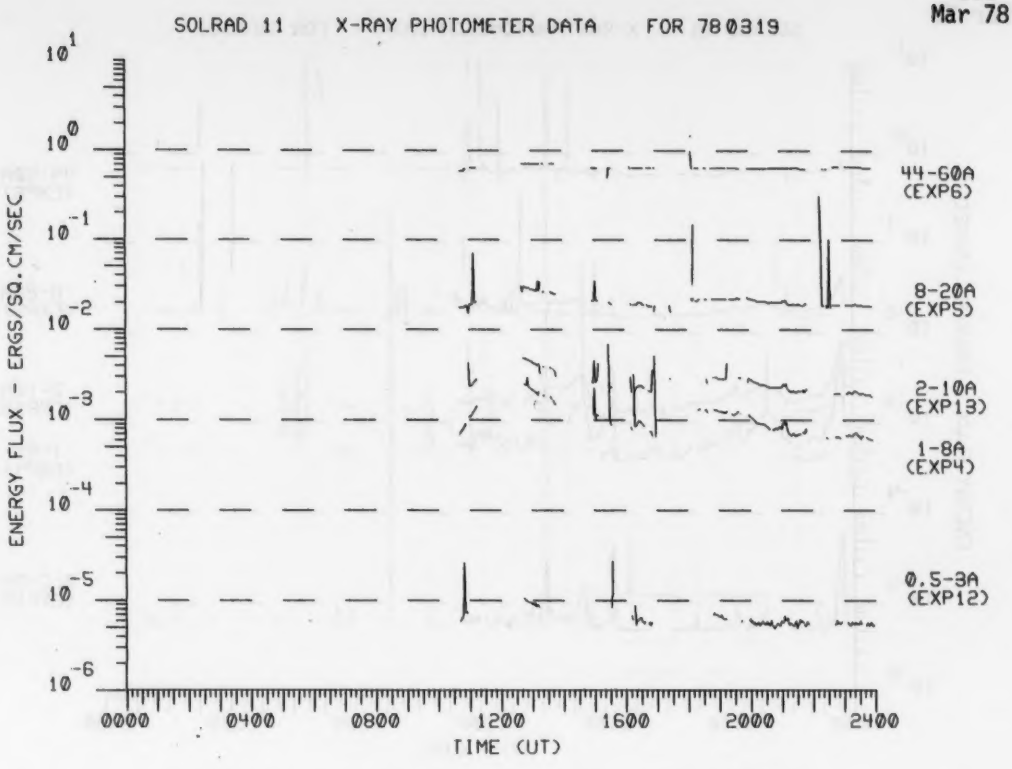

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780316
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780317



SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780318




SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780319
ENERGY FLUX - ERGS/SQ.CM/SEC
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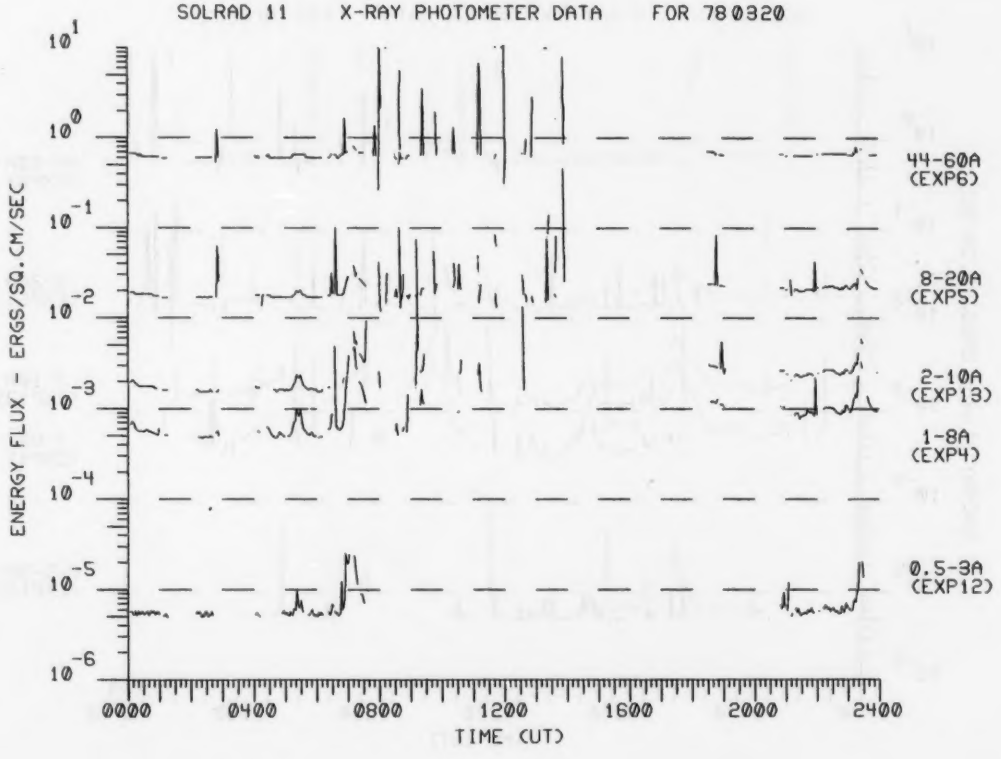
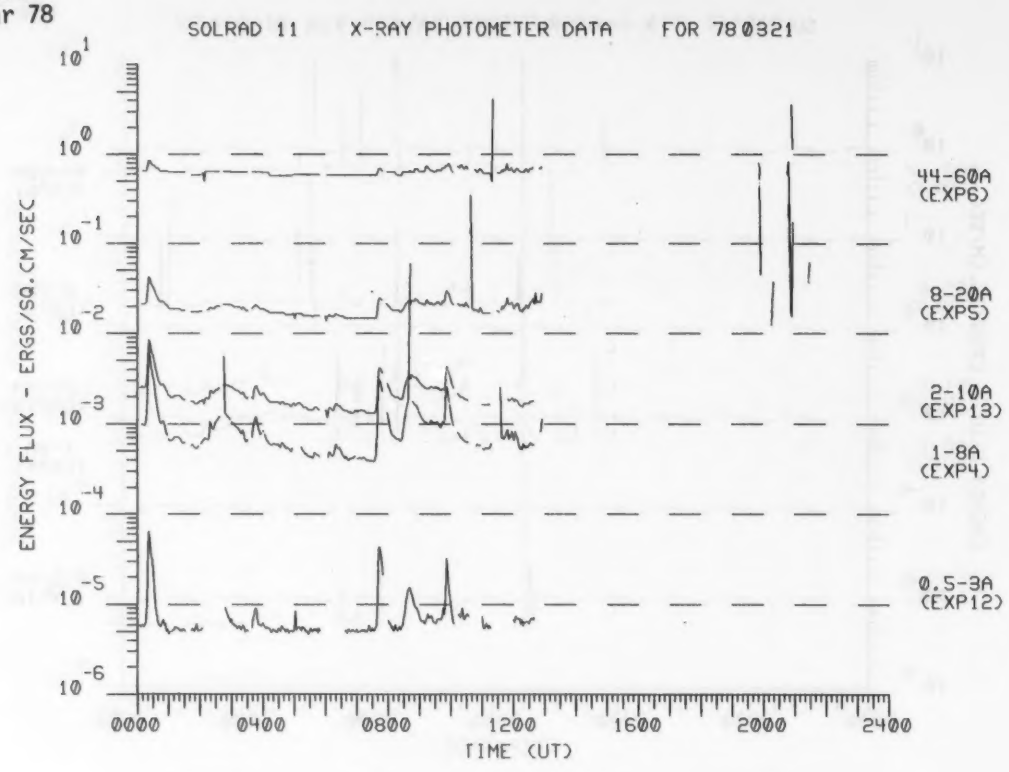
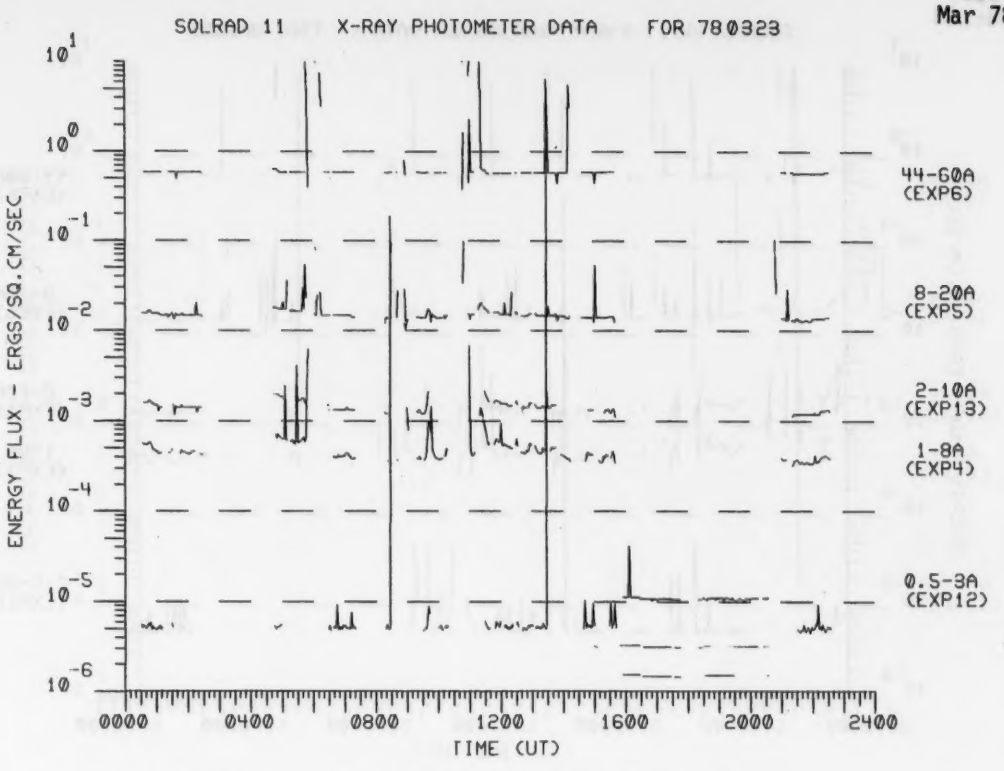
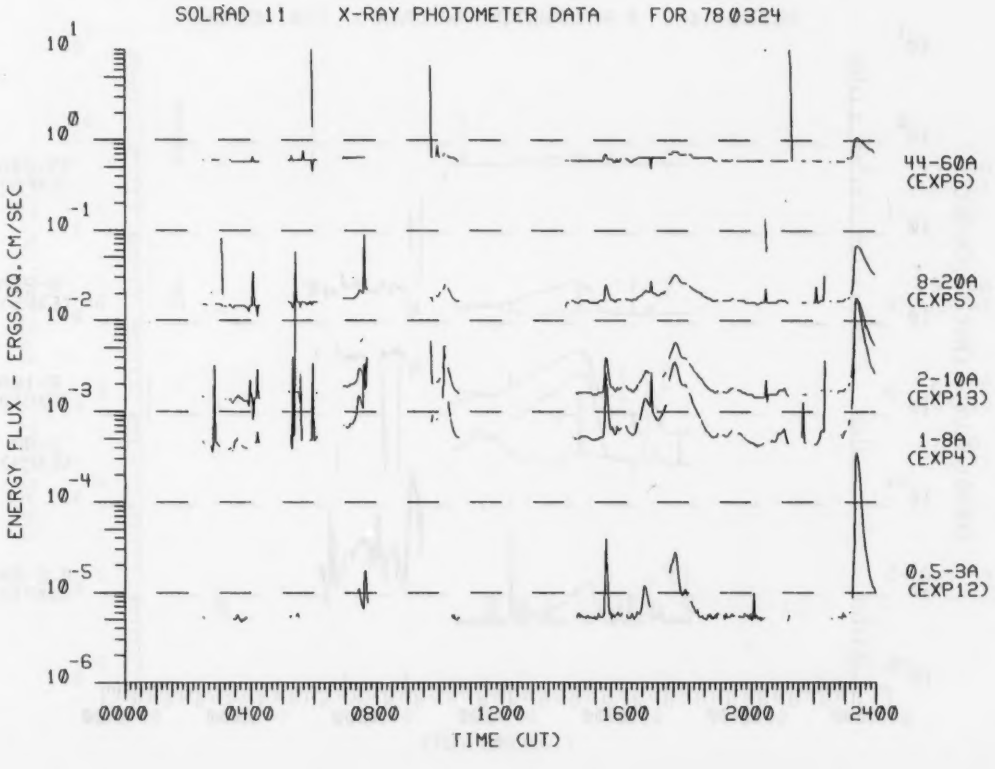
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

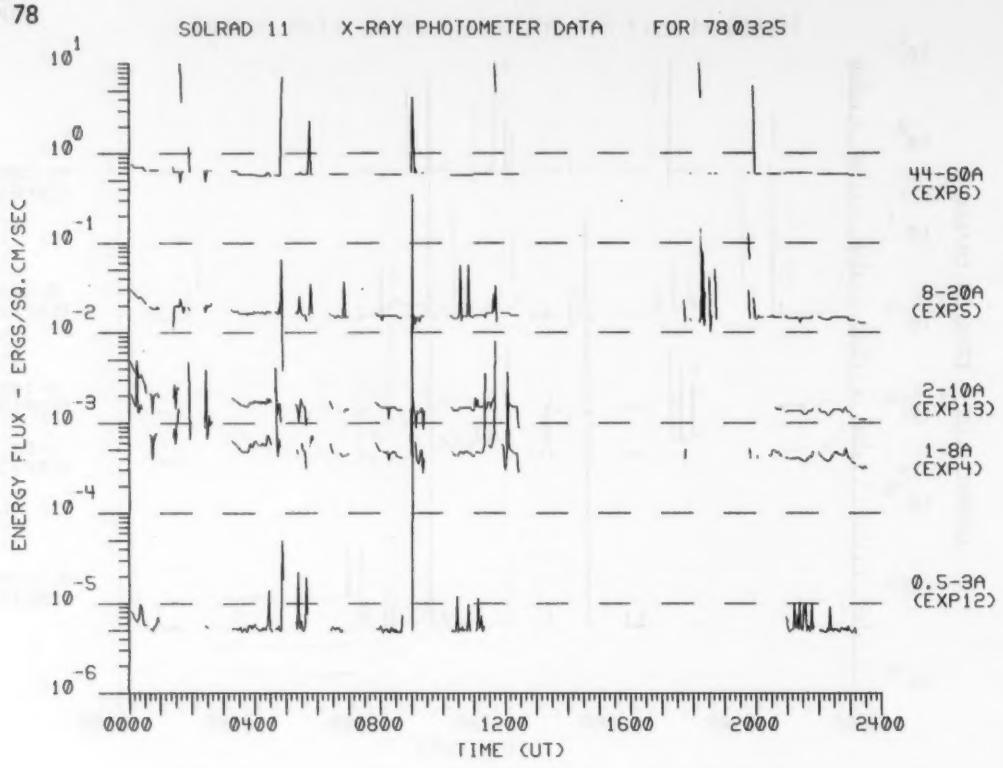

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780320
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780321
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780322
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780323
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780324
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780325
ENERGY FLUX - ERGS/SQ.CM/SEC
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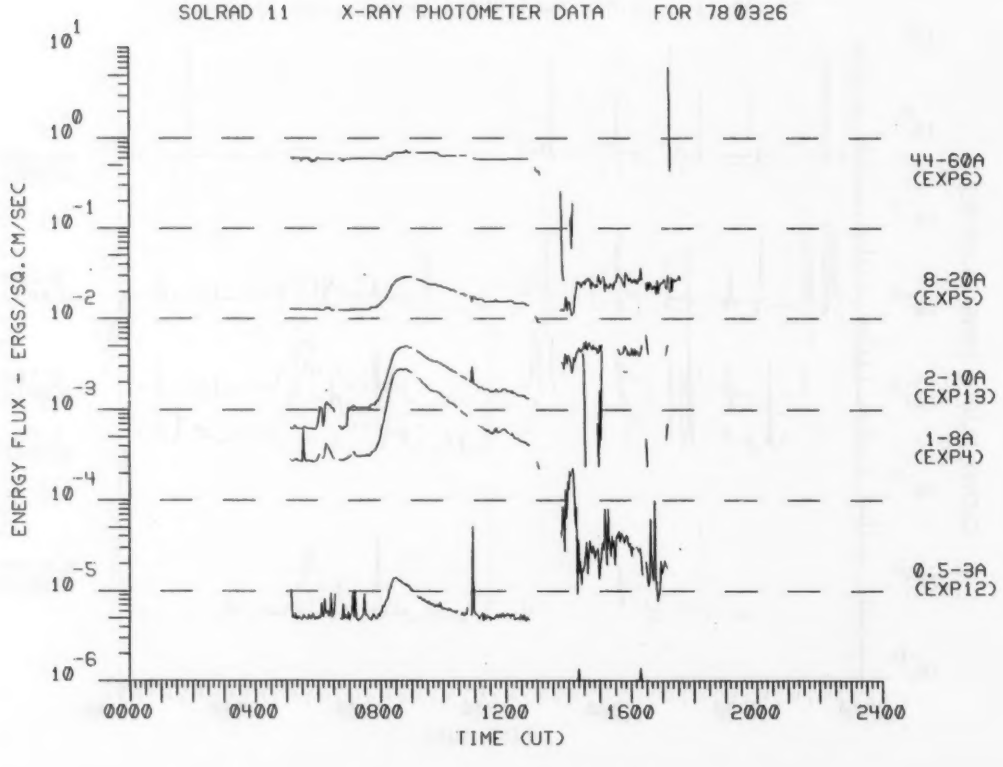
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780326
ENERGY FLUX - ERGS/SQ.CM/SEC
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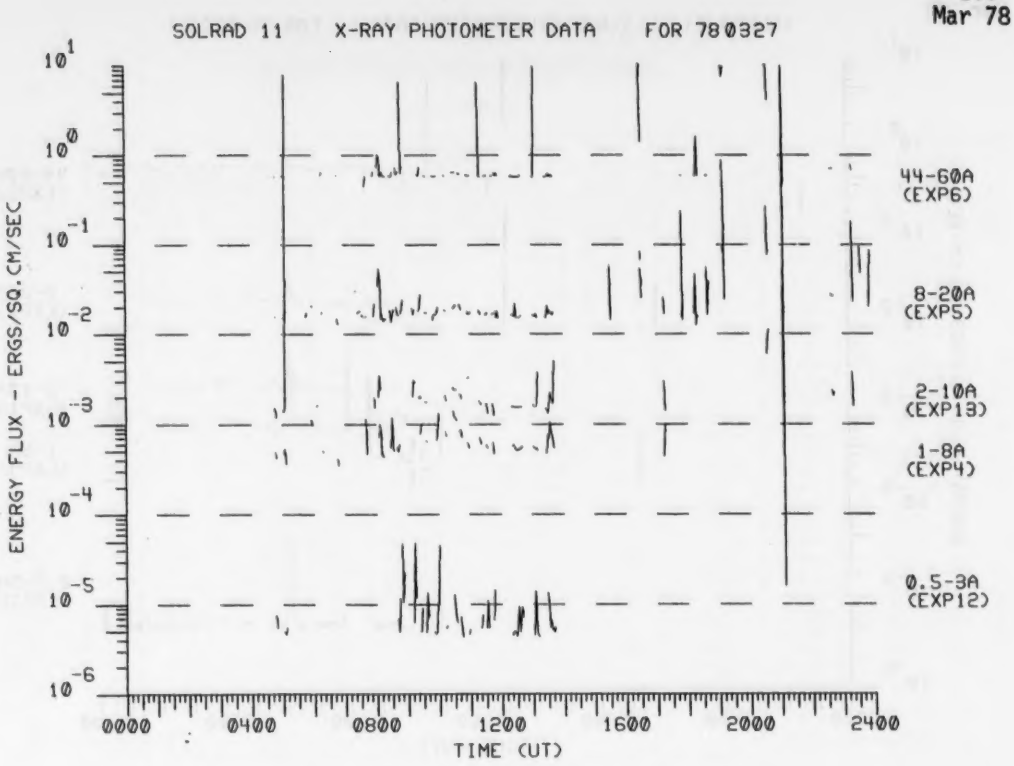
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780327
ENERGY FLUX - ERGS/SQ.CM/SEC
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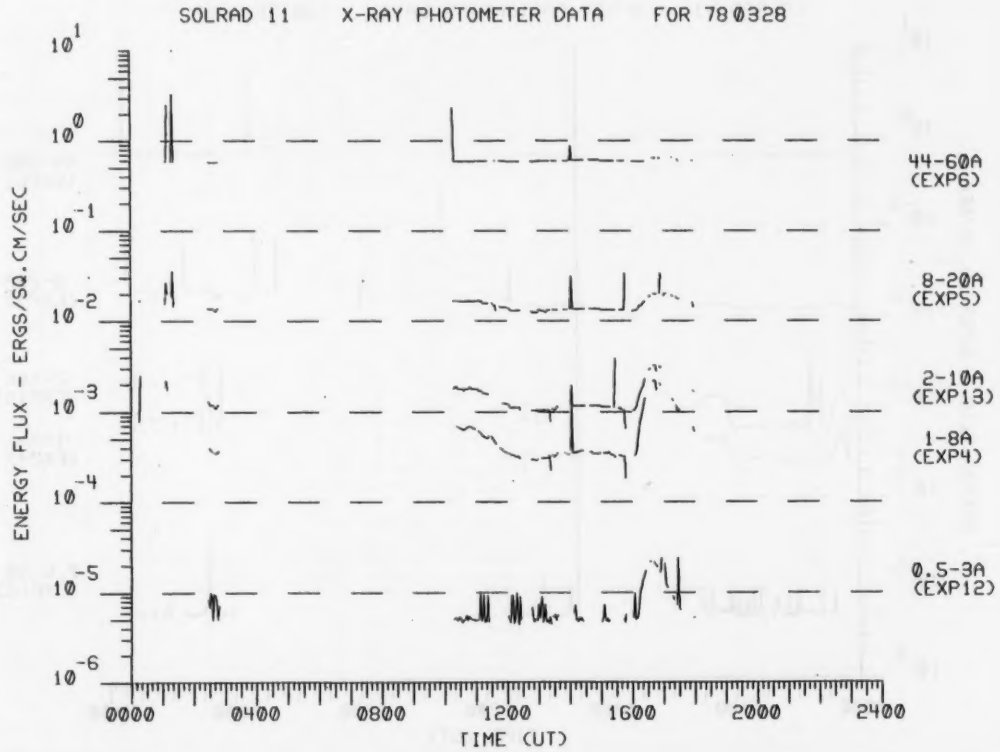
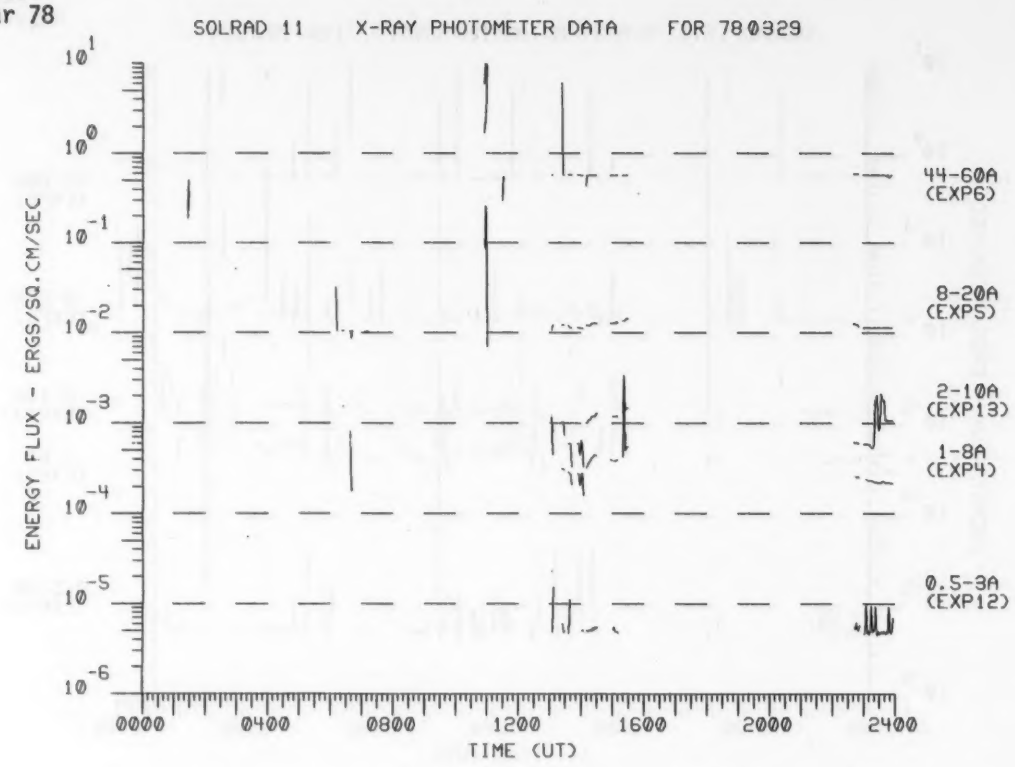
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780328
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780329
ENERGY FLUX - ERGS/SQ.CM/SEC
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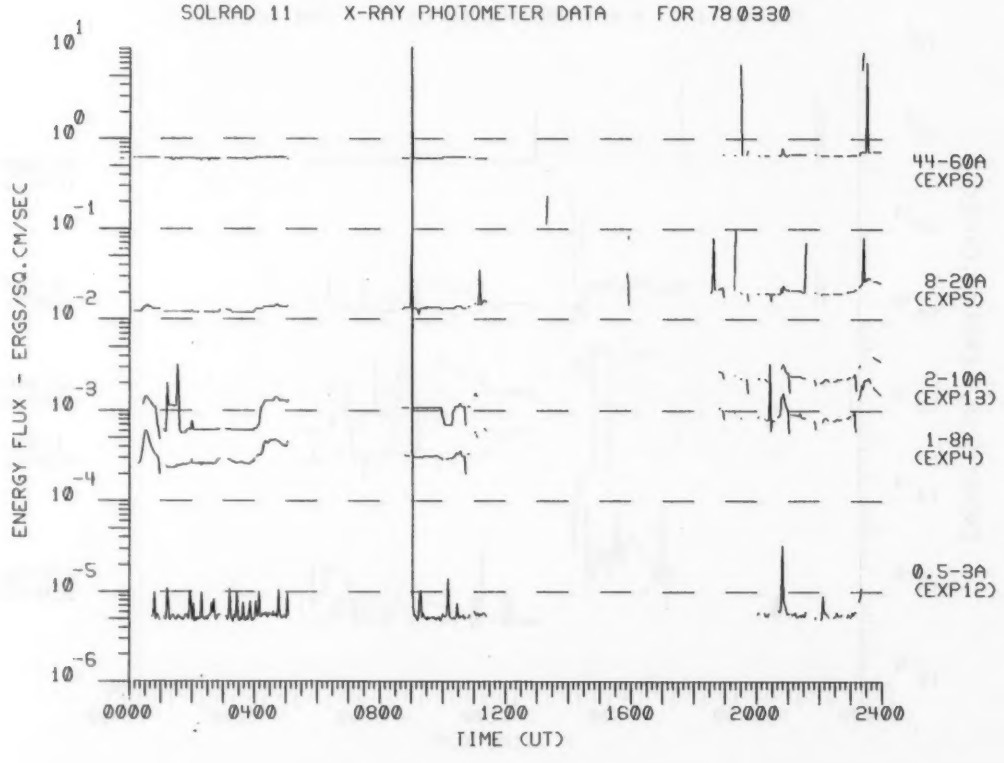
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780330
ENERGY FLUX - ERGS/SQ.CM/SEC
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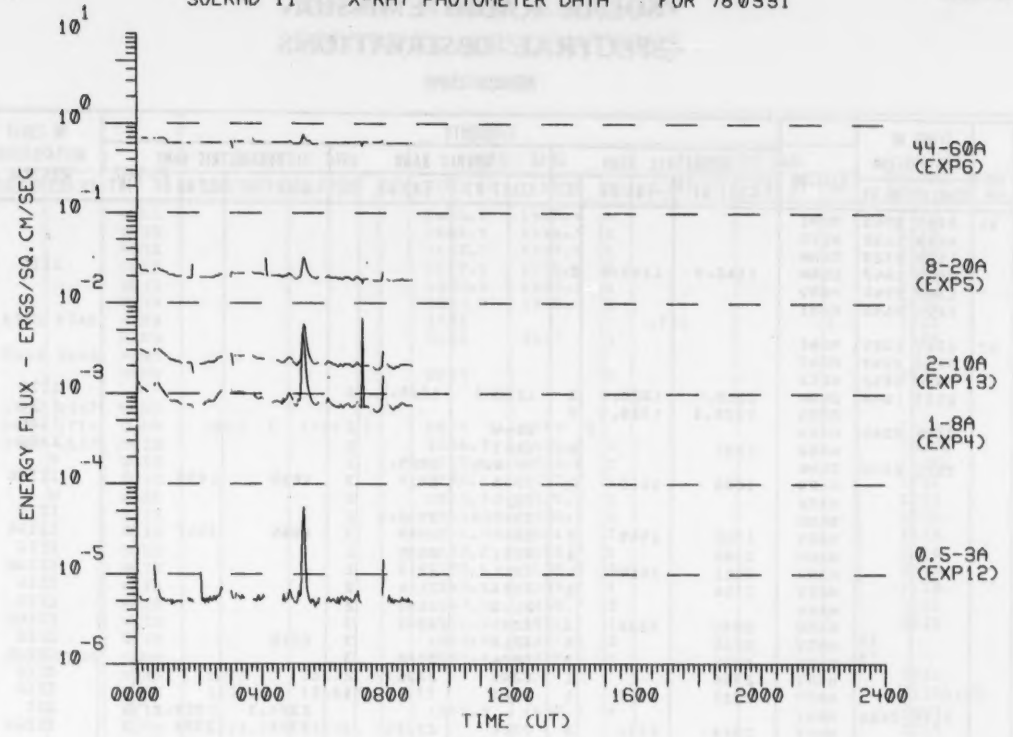
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780331



SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

MARCH 1978

MAR 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
01	0000	0943	MANI										
	0640	1630	WEIS										
	1123	2229	SGMR										
	0634	1647	DURN	1142.9	1143.4	2							IIIG
	1345	2345	HARV										
	2151	2400	MANI										
02	0000	0325	MANI										
	0350	0943	MANI										
	0636	0802	WEIS										
	0633	1648	DURN	1228.6	1228.6	1	1228.7	1228.7	1				IIIG
			DURN	1320.3	1320.4	2							IIIG
	1345	2345	HARV				1644		2				IIIG
			HARV	1803		2	1803		2				IIIG
	1122	2230	SGMR				1808.2	1809.3	1				V
			HARV	1808	1815	2	1808	1815	3	1808	1809	3	IIIGG
			HARV				1815		3				U
			SGMR				1945.0	1948.0	2				IIIG
			HARV	1945	1949	3	1945	1949	3	1945	1947	2	IIIGG
			HARV	2005		1	2001	2005	1				IIIG
			HARV	2011	2015	1	2011	2018	1				IIIGG
			HARV	2114		1	2106	2114	2				IIIG
			HARV				2143	2148	2				IIIG
			HARV	2204	2208	3	2204	2208	3				IIIGG
			HARV	2216		3	2216		3	2216		2	IIIG
			HARV	2228		3	2224	2228	3				IIIGG
			HARV	2306		1	2301	2306	2				IIIG
			HARV	2313	2315	1	2313	2314	1				IIIG
	2139	2400	MANI							2328.3	2329.1	1	III
			HARV	2328	2332	3	2326	2332	3	2328	2329	3	IIIGG
03	0000	0940	MANI							0221.5	0222.7	2	III
	0631	1648	DURN										
	0929	1634	WEIS				1053.5	1053.7	2				IIIG
			WEIS				1055.3	1055.4	1				IIIB
			WEIS				1135.3	1145.6	3				IIIGG
			WEIS				1258.2	1259.0	2				IIIG
	1120	2231	SGMR				1943.1	1943.4	1				III
	1345	2345	HARV				1943		2	1943		2	IIIG
			HARV				2004		2	2004		2	IIIG
	2141	2400	MANI										
04	0000	0635	MANI										
	0629	1649	DURN										
	0641	0938	MANI										
	0633	1735	WEIS				0738.4	0738.9	1				IIIB
			WEIS				1158.7	1207.5	2				IIIGG
			WEIS				1212.0	1212.6	1				IIIG
	1244	2232	SGMR										
	1345	2345	HARV				2020		1				IIIG
	2157	2400	MANI										
05	0000	0955	MANI										
	0627	0810	DURN										
	0631	0823	WEIS				0645.8	0647.4	3				IIIG
	0839	0929	WEIS										
	0939	1647	WEIS				1044.2	1044.3	1				IIIG
			WEIS				1056.4	1458.0	1				IIIG
			WEIS				1105.4	1105.8	1				IIIG
	1117	2233	SGMR										
			WEIS				1140.2	1140.9	2				IIIG
			WEIS				1147.0	1147.2	1				IIIG
			WEIS				1235.2	1236.6	1				IIIG
			WEIS				1257.1	1257.2	1				IIIB
			WEIS				1307.9	1308.1	1				IIIB
			WEIS				1312.4	1312.5	1				IIIG
			WEIS				1314.1	1314.2	1				IIIB
			WEIS				1333.0	1333.5	2				IIIB,U
			WEIS				1414.8	1415.0	1				IIIB
			WEIS				1417.5	1417.6	1				IIIB

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

MARCH 1978

MAR 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
05			WEIS				1420.2	1420.4	1				IIIB
			WEIS				1444.0	1444.3	1				IIIB
			WEIS				1457.7	1457.9	1				IIIB
			WEIS				1517.9	1518.3	3				IIIG
			WEIS				1522.5	1523.3	1				IIIG
			WEIS				1541.9	1542.3	2				IIIG
	1332	2345	HARV				1731		1	1731		1	IIIG
			HARV				2136	2137	1				IIIG
	2140	2400	MANI										
			HARV				2204		1				IIIG
06	0000	0957	MANI										
	0624	1704	DURN	0624 E	1704 D		0624 E	1704 D					IC,DC
	0629	1637	WEIS				0636.0	1634.0	3				IS,DC
			WEIS				0727.8	0729.5	2				IIIGG
			WEIS				0732.2	0733.2	1				IIIG
			WEIS				0924.5	0925.0	1				IIIG
			WEIS				1048.3	1049.0	3				IIIG
			WEIS				1051.3	1051.7	3				IIIG
			WEIS				1103.2	1103.7	1				IIIG
			WEIS				1139.4	1139.9	3				IIIG
			WEIS				1143.1	1143.2	1				IIIB
			WEIS				1147.0	1148.7	3				IIIG
			WEIS				1151.0	1151.7	1				IIIG
			WEIS				1156.5	1227.0	3				II
	1115	2235	SGMR				1156.8	1225.0	1				II
			DURN	1223	1315	1							DCIM
			DURN	1231.6	1248.7	3							IIIGG,RS
			WEIS				1240.0	1637.0	2				CONT
			DURN	1303.2	1303.4	2							IIIG
			SGMR				1303.9	1308.0	1				V
			DURN	1311.3	1311.6	2	1311.3	1311.6	2				IIIG
	1332	2345	HARV				1346	2220	2				I
			SGMR				1350.0	2235.0	1				CONT
			WEIS				1503.0	1627.0	2				IIIS
			HARV				1540	1640	2				DC
	2140	2400	MANI										
07	0000	0955	MANI							0045.2	0045.5	1	III
			MANI							0131.3	0132.3	2	III
			MANI							0246.0	0247.8	2	III
	0621	1704	DURN	0621 E	1704 D	2	0621 E	1704 D	2				I,DC
			MANI							0622.1	0623.1	1	III
			DURN	0622.3	0622.5	2	0622.3	0622.5	3				IIIG
			WEIS				0652.6	0652.7	2				IIIB
			WEIS				0655.7	0656.6	2				IIIG
	0627	0935	WEIS				0657.0	0935.0	2				IS
			WEIS				0711.8	0712.2	2				IIIG
			WEIS				0717.8	0720.9	2				IIIGG
			WEIS				0724.7	0725.1	2				IIIG
			WEIS				0737.5	0737.6	2				IIIB
			WEIS				0749.8	0750.3	2				IIIG
			WEIS				0757.5	0804.0	1				IIIGG
			WEIS				0806.4	0806.6	2				IIIU
			WEIS				0825.0	0825.1	1				IIIB
	1011	1640	WEIS				1020.0	1635.0	2				IDC
			WEIS				1115.8	1116.0	1				IIIG
			WEIS				1122.4	1122.5	1				IIIB
			WEIS				1124.3	1124.5	1				IIIG
	1332	2345	HARV				1346	2323	1				IN
	1114	2236	SGMR				1402.2	1410.0	1				IIIG
			WEIS				1407.2	1409.7	2				IIIGG
			DURN	1408.2	1408.4	1							IIIG
			HARV	1408	1409	1	1407	1410	2				IIIGG
			WEIS				1415.0	1615.0	1				CONT
			HARV				1431	1432	2				IIIG
			HARV				1557		1				IIIB
			HARV				1634		1				IIIB
			HARV				1652		2	1652		2	IIIG
			HARV				1658	1659	3	1658	1659	3	IIIGG

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

MARCH 1978

MAR 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
07			SGMR				1722.1	1729.4	1				IIIG
			HARV				1757		2	1757		1	IIIB
			HARV				1804		1				IIIG
			HARV				2027	2028	3	2028		3	IIIG
			SGMR				2127.3	2128.2	2				IIIG
			HARV				2127	2128	3	2127	2128	3	IIIGG
	2147	2400	MANI										
08	0000	0956	MANI							0510.6	0511.4	1	IIIG
	0619	1704	DURN	0619 E	1704 D	1	0619 E	1704 D	1				I,DC
			DURN	0710.7	0710.8	3	0710.7	0710.8	3				IIIG
	0750	1648	WEIS				0754.0	1648.0	2				IDC
			WEIS				0758.0	0758.8	2				IIIG
			DURN	0839.4	0839.8	1							IIIG
			WEIS				0943.8	0944.1	1				IIIG
			DURN	1029.9	1929.9	1							III
			WEIS				1303.4	1304.4	1				IIIG
			WEIS				1306.9	1307.1	1				IIIG
			WEIS				1349.3	1349.6	1				IIIB
			WEIS				1429.1	1429.7	1				IIIG
	1112	2237	SGMR				1429.4	1429.7	1				III
	1332	2345	HARV				1429	1430	1				IIIG
			WEIS				1430.0	1618.0	1				CONT
			HARV				1618	1634	1				IIIN,W
			HARV				1708	1717	2	1708	1716	1	IIIG
			HARV				1759	1935	1				IIIN
			SGMR				2157.1	2157.4	1				III
			HARV				2157		3	2157		3	IIIG
	2142	2400	MANI							2331.2	2331.3	1	III
09	0000	0305	MANI							0148.4	0153.7	1	IIIG
			MANI							0258.8	0259.0	1	III
			MANI							0304.2	0304.5	1	III
	0334	0951	MANI							0348.5	0348.8	1	III
			MANI							0456.6	0457.3	1	III
	0617	1705	DURN	0617 E	1705 D	1	0617 E	1705 D	1				I,DC
	0625	1052	WEIS				0627.1	1636.0	2				IS
			WEIS				0654.2	0655.0	1				IIIB
			WEIS				0657.8	0658.1	1				IIIG
			WEIS				0752.8	0752.9	2				IIIB
			WEIS				0800.8	0800.9	1				IIIB
			WEIS				0808.5	0811.9	3				IIIGG
			DURN	0810.6	0811.1	3	0810.5	0811.1	3				IIIGG
			MANI							0810.8	0811.5	1	III
			DURN	0825.5	0833.0	3	0825.5	0833.0	3				IIIGG
			WEIS				0825.5	0834.4	3				IIIGG
			WEIS				0906.9	0907.7	2				IIIG
			WEIS				0926.0	0926.2	2				IIIB
			WEIS				1007.5	1007.8	2				IIIB
	1102	1640	WEIS				1133.0	1136.0	3				IIIGG
			WEIS				1143.0	1143.1	2				IIIB
			WEIS				1200.9	1200.9	2				IIIG
			DURN	1231.1	1231.4	3	1231.1	1231.4	3				IIIG
			WEIS				1231.2	1231.4	2				IIIG
			WEIS				1304.5	1304.9	2				IIIG
			DURN	1304.5	1304.8	3	1304.5	1304.8	3				IIIG
	1332	2345	HARV				1439	2123	2				IIIN
			WEIS				1442.8	1443.7	2				IIIG
			WEIS				1444.8	1445.0	2				IIIG
			SGMR				1444.9	1445.1	2				III
			WEIS				1448.9	1449.1	2				IIIB
			WEIS				1509.8	1509.9	1				IIIB
			WEIS				1523.4	1523.6	2				IIIB
	1110	2238	SGMR				1523.5	1523.7	2				III
			WEIS				1601.2	1601.4	2				IIIG
			SGMR				1601.4	1604.2	1				IIIG
			WEIS				1603.8	1605.0	2				IIIG
			WEIS				1613.2	1615.2	3				IIIGG
			SGMR				1613.5	1615.2	2				V
			HARV	1615		2	1613	1615	3	1613	1615	3	IIIGG

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

MARCH 1978

MAR 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
09			HARV				1728	1732	2	1728	1730	2	IIIGG
			HARV	1840	1841	3	1840	1841	2				IIIGG
			SGMR				2022.4	2026.3	1				IIIG
			HARV				2022	2023	2	2022	2023	2	IIIG
			HARV	2103	2105	2	2103	2105	1				IIIG
	2150	2400	MANI										
10	0000	0952	MANI							0106.0	0106.8	2	III
	0615	1705	DURN	0615 E	1705 D	1	0615 E	1705 D	1				I,DC
	0622	1335	WEIS				0646.0	1636.0	2				IDC
			DURN	0748.5	0748.5	3							IIIG
			WEIS				0829.3	0830.0	3				IIIG
			DURN	0829.5	0829.9	3	0829.5	0829.9	3				IIIG
			WEIS				0831.0	0831.5	2				IIIG
			WEIS				0832.7	0834.0	1				IIIG
			WEIS	1016.8	1019.0	2							IIIG
			DURN	1056.7	1059.1	3							IIIGG
			WEIS				1109.8	1111.9	2				IIIG
			WEIS				1149.2	1149.3	1				IIIB
			WEIS				1150.0	1535.0	1				CONT
			WEIS				1238.4	1238.5	1				IIIB
	1108	2239	SGMR				1247.8	1248.2	1				IIIG
	1332	2345	HARV				1340	1704	1				IN
	1346	1643	WEIS										
			HARV				1448		1				IIIB
			HARV				1617		2	1617		2	IIIB
			HARV				1632	1633	2	1632	1633	2	IIIG
			HARV				1739		1	1739		1	IIIB
			HARV				1757		2	1757		2	IIIG
			HARV				1810		1	1810		1	IIIB
			HARV				1926		2	1926		2	IIIG
	2143	2400	MANI										
11	0000	0952	MANI										
	0610	0832	DURN	0610 E	0832 D	1	0610 E	0832 D	1				I,DC
	0621	1113	WEIS				0623.5	1110.0	2				IDC
			WEIS				0836.8	0838.7	2				IIIG
	1107	2241	SGMR				1206.9	1207.3	1				III
	1402	1712	DURN	1402 E	1712 D	1	1402 E	1712 D	1				I,DC
	1332	2345	HARV				1603	1817	2				I
			HARV				1634	2101	2	1644	2101	1	IIIN
			SGMR				1639.5	2241.0	1				CONT
			HARV				1807		2	1807		2	IIIG
			HARV				1827	1828	2	1827	1828	2	IIIG
	2150	2400	MANI										
12	0000	0953	MANI										
	0608	1712	DURN	0608 E	1712 D	1	0608 E	1712 D	1				I,DC
			DURN	0643.3	0643.8	1	0643.3	0643.8	1				IIIG
	1332	2345	HARV				1717	1721	2	1717	1721	2	IIIG
			HARV				1844		1				IIIB
	1105	2242	SGMR				1911.1	1911.5	2				V
			HARV				1911		3	1911		3	IIIG
			SGMR				1912.7	1923.4	3				V
			HARV				1922	1923	3	1922	1923	3	IIIGG,V
			HARV				1924	1937	2	1924	1937	2	IIIGG
			SGMR				1928.1	1930.6	2				IIIG
			HARV				1951	1955	2	1951		1	IIIG
			HARV	1954	1957	1							IIIG
			HARV				2026	2033	1	2026	2033	1	IIIG
	2140	2400	MANI										
			HARV				2327		1				IIIG
13	0000	1000	MANI										
	0607	1713	DURN	0607 E	1713 D	1	0607 E	1713 D	1				I,DC
	0804	1057	WEIS				0808.0	1605.0	2				IDC
			WEIS				0916.6	0918.4	2				IIIG
			WEIS				1036.8	1037.4	2				IIIG
			DURN	1037.0	1037.4	3	1037.0	1037.4	3				IIIG,RS
	1058	1647	WEIS				1144.1	1144.3	2				IIIB

SOLAR RADIO EMISSION
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MAR 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
13			DURN	1144.2	1144.5	3	1144.2	1144.5	3				IIIG
			WEIS				1254.0	1254.2	1				IIIG
			WEIS				1334.0	1334.9	2				IIIG
	1103	2243	SGMR				1334.2	1335.1	1				IIIG
			WEIS				1337.5	1337.7	2				IIIG
			SGMR				1413.0	1414.1	1				IIIG
			SGMR				1934.9	1936.5	1				IIIG
	1332	2345	HARV				1935	1936	3	1935	1936	3	IIIG
			HARV				2046	2156	1				IN
			HARV				2047	2050	1				IIIG
	2141	2400	MANI										
			HARV				2257		3				IIIG
14	0000	0950	MANI							0338.5	0341.5	2	IIIG
	0607	1713	DURN	0607 E	1713 D	1	0607 E	1713 D	1				I
	0635	0835	WEIS				0635.0	1608.0	2				I
			DURN	0718.1	0718.1	1							III
			DURN	0814.4	0814.7	1	0814.4	0814.7	1				IIIG
	0845	1643	WEIS				0850.7	0852.5	1				IIIG
			WEIS				1117.2	1119.1	3				IIIG
			WEIS				1313.5	1313.6	1				IIIB
			WEIS				1422.8	1424.1					IIIG
	1102	2244	SGMR				1423.0	1424.4	2				V
	1332	2345	HARV				1423	1424	2				IIIG
			WEIS				1537.8	1549.7					IIIG
			SGMR				1547.9	1549.8	1				IIIG
			SGMR				1853.7	1854.0	1				III
			HARV				1853	1854	3	1854		3	IIIG
	2131	2400	MANI										
15	0000	0957	MANI							0233.7	0233.9	1	III
	0607	0918	DURN	0607 E	0918 D	1	0607 E	1918 D	1				I,DC
	0613	1650	WEIS				0630.9	0633.7	1				IIIG
			WEIS				0657.0	1523.0	3				IDC
	1103	1714	DURN	1103 E	1714 D	3	1103 E	1714 D	3				IC,DC
			WEIS				1135.0	1646.0	3				IIIS
	1100	2245	SGMR				1207.9	1615.0	1				CONT
	1332	2345	HARV				1332	1618	2				IN
			WEIS				1526.0	1526.3	3				IIIB
			DURN	1702.8	1703.6	1	1702.6	1703.6	2				IIIGG
			SGMR				1702.8	1704.9	2				V
			HARV				1703	1708	3	1703	1708	3	IIIGG,V
			HARV				1801	1840	1				IN,W
	2137	2400	MANI										
16	0000	1001	MANI										
	0607	1621	DURN	0607 E	1621 D	2	0607 E	1621 D	2				I,DC
	0816	0907	WEIS				0906.7	0906.8	1				IIIB
	1004	1240	WEIS										
	1058	2247	SGMR				1315.8	1331.1	1				IIIG
	1500	1632	WEIS										
	2143	2400	MANI										
	1332	2345	HARV				2246	2251	2				IIIG
			HARV				2253		2				U
17	0000	1000	MANI										
	0608	1045	WEIS				0855.4	1557.0	1				IIIN
			WEIS				0920.3	0920.4	1				IIIB
	1047	1653	WEIS				1218.0	1219.0	1				IIIG
			WEIS				1252.8	1253.0	2				IIIG
			WEIS				1439.4	1439.6	1				IIIB,U
	1332	2345	HARV				1439		1				IIIB
			HARV				1510		1				IIIB
			WEIS				1554.8	1554.9	2				IIIB
			HARV				1555		1				IIIB
			WEIS				1612.8	1613.1	3				IIIG
	1056	2248	SGMR				1613.0	1613.2	1				III
			HARV				1613		3	1613		2	IIIG
			HARV				1623		1				IIIG
			WEIS				1650.0	1650.4	2				IIIB

SOLAR RADIO EMISSION
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MARCH 1978

MAR 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
17			HARV				1650	1651	2	1650	1651	1	IIIG
			HARV				1735		1				IIIG
			SGMR				1824.9	1825.1	2				III
			HARV				1825		3	1825		3	IIIG
			HARV				1944		2				IIIG
			SGMR				1957.8	1958.3	2				IIIG
			HARV				1957	1958	3	1957	1958	3	IIIG
			HARV				2119	2120	1				IIIG
	2127	2400	MANI										
18	0000	1304	MANI										
	0607	1720	DURN	0607 E	1720 D	1	0607 E	1720 D	1				I,DC
	0606	0822	WEIS				0612.0	1631.0	2				IS,DC
			WEIS				0613.0	1558.0	1				IIIN
			WEIS				0754.2	0754.9	3				IIIB
			WEIS				0756.4	0758.6	3				IIIGG
			WEIS				0800.4	0800.6	1				IIIB
			WEIS				0803.9	0804.0	1				IIIG
	0925	1655	WEIS										
			DURN	1058.3	1100.0	1	1058.3	1100.0	2				IIIGG
	1055	2249	SGMR				1340.1	1340.4	2				IIIG
	1332	2345	HARV				1340		2				IIIG
			HARV				1800	1918	1				IN
			HARV				1832		1	1832		1	IIIG
			HARV				1853	1857	1				IIIG
			HARV				1907		1	1907		1	IIIB
	2151	2400	MANI										
19	0000	1002	MANI										
	0552	1720	DURN	0552 E	1720 D	1	0552 E	1720 D	2				I,DC
	1053	2250	SGMR										
			DURN	1303.8	1303.9	2							III
	1332	2345	HARV				2125	2126	2				IIIG
	2135	2400	MANI										
20	0000	0120	MANI										
	0330	0744	MANI										
	0551	1721	DURN	0551 E	1721 D	1	0551 E	1721 D	1				IS,DC
			WEIS				0653.0	1445.0	2				IN,DC
	0602	1702	WEIS				0654.0	0711.5	3				IIIGG
			WEIS				0658.0	0658.2	3				IIIB,RS
			DURN	0659.0	0659.3	1	0659.0	0659.3	1				IIIG
			DURN	0709.7	0710.0	1	0709.7	0710.0	3				IIIG
	0749	1000	MANI										
			WEIS				0849.8	0850.0	1				IIIB
			WEIS				1004.9	1005.1	1				IIIB
			WEIS				1057.3	1058.7	1				IIIG
			WEIS				1106.7	1106.8	1				IIIB
			WEIS				1132.5	1132.7	1				IIIB
			WEIS				1152.0	1152.2	2				IIIG
			DURN	1152.2	1152.3	2	1152.2	1152.3	3				IIIG
			WEIS				1227.2	1227.3	1				IIIG
			WEIS				1358.0	1358.3	1				IIIB
	1051	2251	SGMR				2114.2	2114.4	2				III
	2133	2400	MANI										
	1318	2345	HARV	2217			2217	2218	2				IIIG
21	0000	1000	MANI										
	0548	1721	DURN	0548 E	1500	1	0548 E	1500	1				I,DC
	0600	0630	WEIS				0611.0	1527.0	2				IN,DC
	0647	1659	WEIS				0759.8	0802.8	2				IIIG
			WEIS				1014.5	1015.0	1				IIIG
			WEIS				1030.7	1032.5	2				IIIG
			WEIS				1035.9	1036.2	2				IIIB
			WEIS				1104.8	1104.9	1				IIIB
			WEIS				1112.3	1112.5	1				IIIG
			WEIS				1418.2	1424.3	1				IIIG
	1049	2252	SGMR				1418.5	1419.8	1				IIIG
	1315	2345	HARV				1418	1424	1				IIIG,W
	2137	2400	MANI										

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

MARCH 1978

MAR 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
21			HARV				2329	2330	3				IIIG
22	0000	1000	MANI										
	0558	1620	WEIS				0830.8	0837.5	3				IIIGG
	0713	1337	DURN	0831.3	0832.9	2	0831.3	0832.9	2				IIIGG
			WEIS				0832.5	0832.6	2				RS
			WEIS	1054.8	1055.3	1							IIIG
			DURN	1055.1	1055.2	3							IIIG
			WEIS				1344.2	1345.5	1				IIIG
			WEIS				1537.5	1538.2	1				IIIG
	1632	1701	WEIS				1639.3	1639.7	1				IIIG
	1315	2330	HARV				1659	1700	2				IIIG
			HARV				1850	1852	2				IIIG
	1048	2254	SGMR				2028.3	2029.1	1				IIIG
			HARV				2028	2029	3				IIIGG
			HARV				2104		3				IIIB,V
	2126	2400	MANI										
23	0000	1000	MANI										
	0624	1722	DURN										
	0554	1704	WEIS				0746.5	0747.1	2				IIIG,U
	1046	2255	SGMR										
	1315	2345	HARV										
	2131	2400	MANI										
24	0000	1000	MANI										
	0545	1726	DURN				0640	1230	1				IS
	0552	1411	WEIS				0723.8	0729.6	1				IIIG
			WEIS				0742.7	0743.5	1				IIIG
			WEIS				0836.0	1106.5	1				IN
			WEIS				1040.1	1040.3	1				IIIG
			DURN	1040.3	1040.4	2	1040.3	1040.4	3				IIIG
	1044	2256	SGMR										
			WEIS				1134.3	1140.6	2				IIIGG
	1428	1705	WEIS										
	1315	2345	HARV				1730	1732	1				IIIG
			HARV				2316	2324	2				IIIGG
	2128	2400	MANI							2345.0	2345.2	1	III
25	0543	1727	DURN	0543 E	1530	1	0543 E	1530	1				IS,W
	0625	1002	MANI										
	1042	2257	SGMR										
	0550	1707	WEIS				1308.2	1308.6	1				IIIG
			DURN	1322.8	1322.9	3							IIIG
	2146	2400	MANI										
	1315	2345	HARV	2249		2							IIIG
26	0000	1004	MANI										
	0541	1732	DURN										
	0548	1230	WEIS				0600.9	0609.9	2				IIIG
			WEIS				0749.0	0830.0	2				I
	1041	2258	SGMR										
	1315	2345	HARV										
	2131	2400	MANI										
27	0000	0535	MANI							0213.0	0213.2	1	III
	0539	1334	DURN				0539 E	1334 D	2				I,DC
	0546	1709	WEIS				0556.0	1544.0	1				IIIS
			WEIS				0557.0	1642.0	2				IS
			WEIS				0559.5	0559.6	1				IIIB
			WEIS				0612.5	0612.6	1				IIIB
			WEIS				0627.5	0627.6	1				IIIB
	0717	1000	MANI										
	1548	1736	DURN	1548 E	1736 D	1	1548 E	1736 D	2				I,DC
	1039	2259	SGMR				1731.8	1732.3	1				III
	1315	2330	HARV				1911	1921	1				IN,W
	2140	2400	MANI										
28	0000	0959	MANI										
	0537	1737	DURN	0709.6	0710.7	2	0709.6	0710.7	2				IIIGG

SOLAR RADIO EMISSION
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MAR 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
28	0543	0830	WEIS				0710.0	0711.0	2				IIIG
	0957	1711	WEIS				1127.8	1129.2	2				IIIG
			WEIS				1210.9	1211.3	1				IIIG
			WEIS				1244.8	1244.9	1				IIIB
			WEIS				1351.3	1351.4	1				IIIB
	1037	2300	SGMR				1552.2	1552.4	1				III
			WEIS				1555.0	1555.3	2				IIIB
			WEIS				1613.5	1616.0	1				IIIG
			WEIS				1616.5	1619.0	1				II
			SGMR				1617.0	1619.6	1				IIIG
			WEIS				1635.0	1643.0	2				II
	1315	2330	HARV				1635	1643	2	1640	1643	1	II
			SGMR				1636.0	1644.1	2				II
	2114	2400	MANI										
29	0000	1004	MANI										
	0535	1737	DURN	0648.9	0650.5	2	0648.7	0650.5	2				IIIG
	0730	1300	WEIS										
	1330	1711	WEIS				1425.8	1426.2	2				IIIG
	1035	2302	SGMR				1425.9	1426.3	2				V
	1315	2340	HARV				1426		1				IIIB
			WEIS				1522.5	1523.0	1				IIIG
			HARV				1832		1				IIIB
			HARV				2126		2				IIIG
	2138	2400	MANI										
30	0000	1001	MANI										
	0534	1738	DURN										
	0542	0919	WEIS										
	1034	2303	SGMR										
	1315	2345	HARV										
	1402	1450	WEIS				1417.2	1417.7	1				IIIG
			WEIS				1438.6	1438.8	1				IIIG
	1501	1601	WEIS										
	1604	1657	WEIS										
	1659	1712	WEIS										
	2129	2400	MANI										
31	0000	1000	MANI										
	1032	2304	SGMR										
	0539	1714	WEIS				1103.3	1103.8	1				IIIG
	0532	1738	DURN	1113.3	1113.8	1	1113.3	1113.8	1				IIIG
	1315	2345	HARV										
			DURN	1318.6	1318.6	1	1318.6	1318.6	1				IIIB
			WEIS				1329.2	1329.6	1				IIIG
	2132	2400	MANI										

The symbols used in connection with the spectral type in describing the important bursts are as follows:

B = Single burst
G = Small group (< 10) of bursts
GG = Large group (> 10) of burst
C = Underlying continuum (particularly with type I)
S = Storm in the sense of intermittent but apparently connected activity
N = Intermittent activity in this period
U = U-shaped burst of Type III

RS = Reverse slope burst
DP = Drifting pairs
DC = Drifting Chains
H = Herringbone
W = Weak
P = Pulsations
CONT = Continuum
UNCLF = Unclassified activity

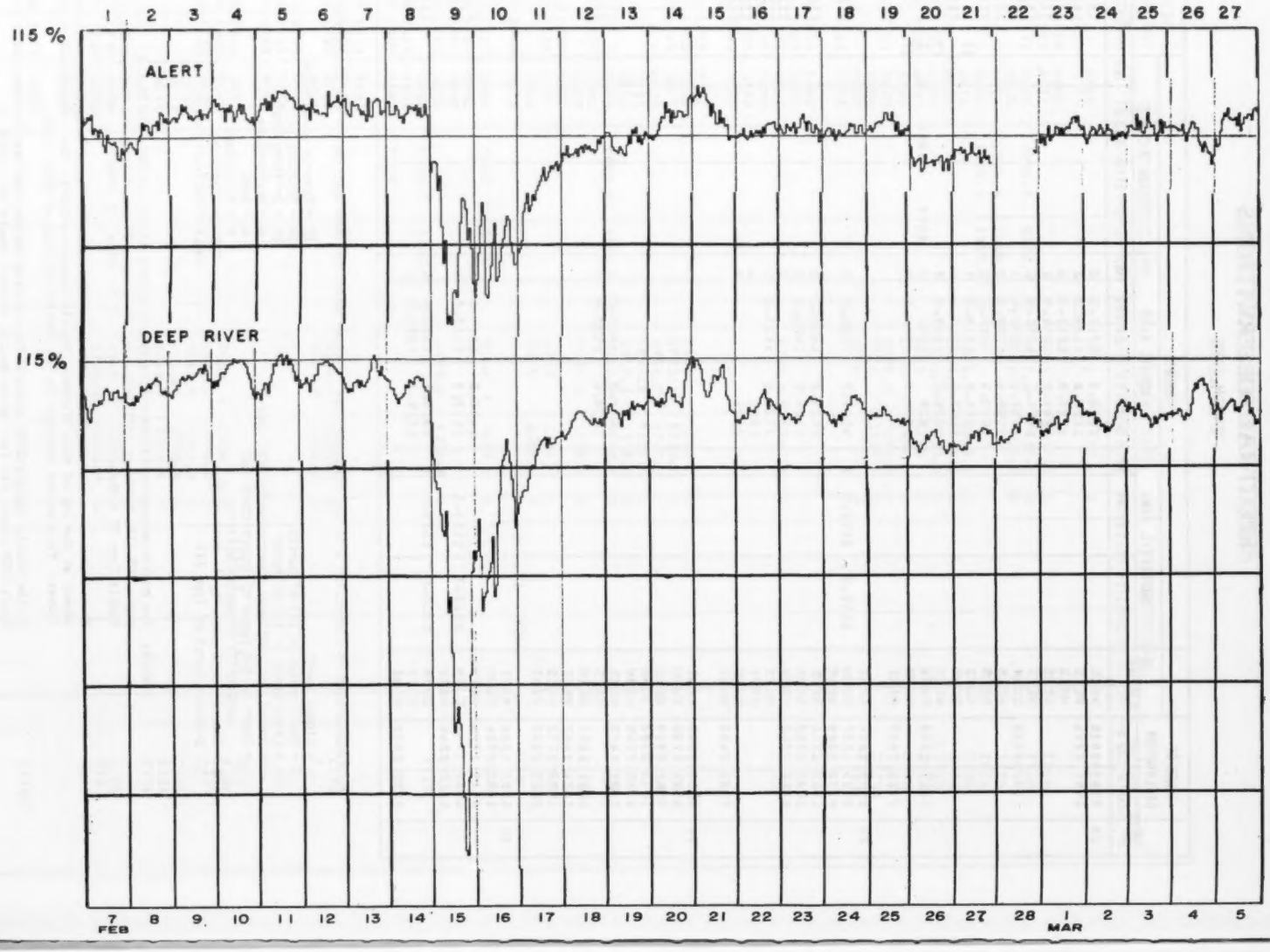
ERRATA: The Manila December 1977 Type II spectral events listed in SGD, 402 Part I, pages 108-119, February 1978 issue are in error. Please delete all the Manila Type II events.

Please note also that the Manila December 1977 data for days 1-9 December appear at the end of this listing. Manila changed slightly their keypunch format. This caused problems in the routine listing of these data.

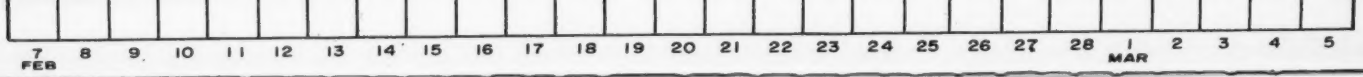
In the Manila January 1978 spectral data listed in SGD, 403 Part I, page 136, March 1978 issue, the last seven Manila entries should not appear on 31 January. These data cards did not have a date on them and were thus sorted to the end of the listing. Corrections will appear in the next issue of SGD.

COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1976 (February-March 1978)



COSMIC RAY INDICES

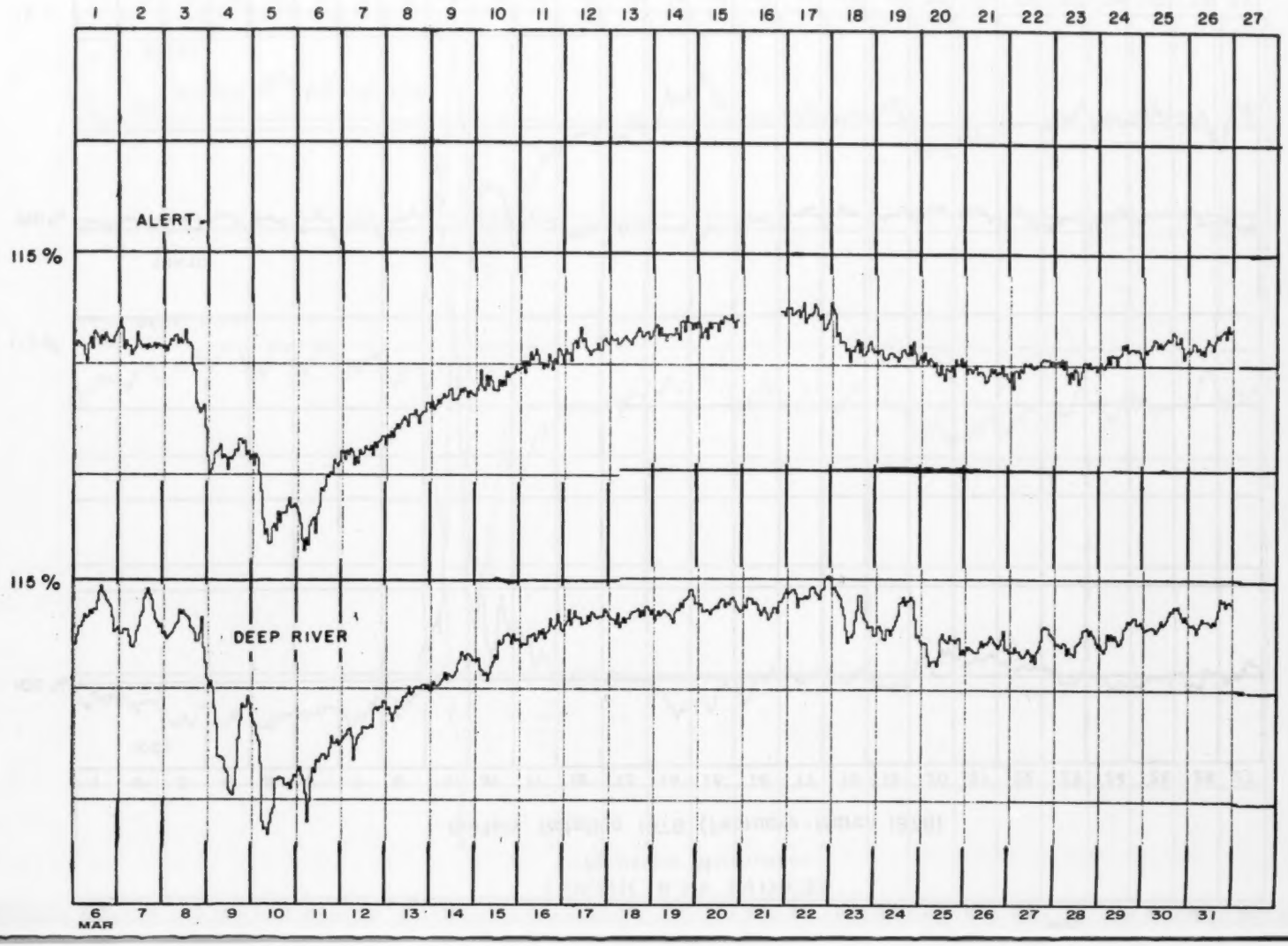


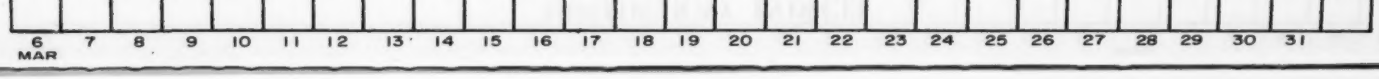
COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1976 (February - March 1978)

COSMIC RAY INDICES
(Neutron Monitors)

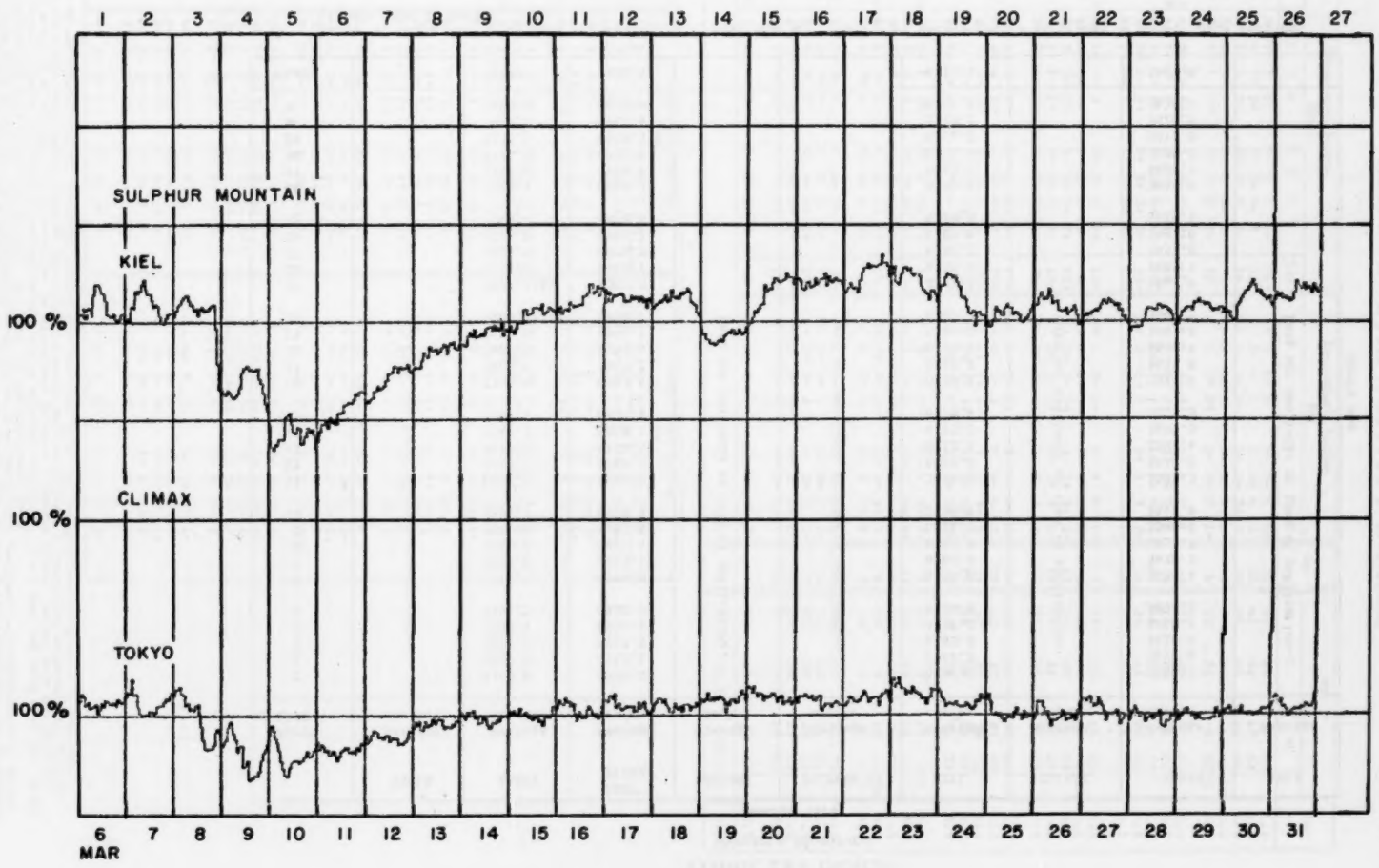
Bartels Rotation 1977 (March 1978)





COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1977 (March 1978)



COSMIC RAY INDICES

(Neutron Monitors)

MARCH 1978

March 1978	THULE Average cts/hr	ALERT Average cts/hr	DEEP RIVER Average cts/hr	CALGARY Average cts/hr	SULPHUR MT Average cts/hr	KIEL Average cts/hr	CLIMAX Average cts/hr	TOKYO Average cts/hr	KULA Average cts/hr
1		7360.0	6909.0			6228.1		3626.9	
2		7352.5	6912.1			6247.2		3620.6	
3		7371.0	6917.5			6243.0		3616.1	
4		7342.4	6955.1			6237.5		3618.1	
5		7391.5	6935.3			6218.5		3634.2	
6		7414.4	6976.0			6253.0		3638.4	
7		7405.0	6953.2			6260.6		3638.3	
8		7339.0	6927.4			6235.4		3612.7	
9		7071.9	6633.8			6011.0		3546.6	
10		6909.9	6503.9			5855.5		3542.6	
11		6935.1	6559.5			5926.3		3551.3	
12		7086.1	6664.3			6026.8		3574.8	
13		7177.3	6744.3			6112.1		3599.4	
14		7248.3	6818.2			6173.0		3609.3	
15		7297.6	6867.1			6228.4		3615.3	
16		7356.4	6923.4			6278.1		3624.9	
17		7400.6	6967.2			6282.2		3633.8	
18		7428.5	6973.4			6276.5		3632.9	
19		7453.0	6994.7			6164.0		3643.6	
20		7468.0(21)	6999.7			6301.3		3649.3	
21		7507.5(4)	7001.3			6333.5		3641.0	
22		7499.2	7041.1			6355.6		3645.7	
23		7409.0	6972.5			6332.7		3657.6	
24		7378.8	6961.7			6282.8		3637.8	
25		7345.0	6885.6			6229.0		3616.1	
26		7323.1	6892.3			6255.2		3614.8	
27		7342.8	6889.6			6243.7		3624.7	
28		7336.8	6901.9			6224.4		3609.0	
29		7376.9	6927.3			6251.2		3611.2	
30		7411.4	6962.4			6279.7		3620.5	
31		7420.3	6973.5			6301.5		3630.7	
MEAN		7327.7	6888.5			6214.4		3617.4	

Data not available at time of publication.

( ) Number of hours for which data are available if less than 24. Number of Section Hours at Climax if sum of both sections is less than 40 hours.

Notes: Tokyo neutron monitor counting rate increased by 2.0/1.5 since the beginning of September 1977. The number of counters changed from 27 to 36. Since the scaling factor has been changed, the listed figures are nearly the same as those in and before May 1977. The level in June, July, and August, 1977 is slightly lower than before. The level in September 1977 has been adjusted, so that direct comparison with the data in and before May, 1977 is possible.

Thule, Alert, Calgary, Sulphur Mountain, Kiel, Climax and Kula Scaling Factors = 100. Deep River Scaling Factor = 300. Tokyo Scaling Factor = 256.

Kula data are available on magnetic tape from the World Data Center A for Solar-Terrestrial Physics. These data include the periods July 1967-December 1970 and October 1975 to the present.

GEOMAGNETIC ACTIVITY INDICES

MARCH 1978

Day		Three-Hourly Indices Kp									Three-Hourly Indices Km								Ap	aa *					Cp
		1	2	3	4	5	6	7	8	Sum	1	2	3	4	5	6	7	8		N	S	M			
1	D3	3+	3+	3	5-	5-	5	5	5-	34-	3+	3	2+	4	5-	5-	5	4+	33	52	45	32	65		1.3
2	D4	4+	4	5+	3+	3+	3+	4+	3	31	4	3+	4	3	3	3+	4	3	27	47	32	47	33		1.2
3		4-	3+	3	3-	3-	3-	3	3	24	3+	3-	3-	3-	3-	3-	3+	3	15	26	23	24	26		0.9
4	Q1	1+	1-	0+	1-	1-	0	0+	1-	5-	1	1	0+	1-	0+	0	0	1-	3	3	4	4	3	CK	0.0
5	Q5	0+	0	1	2+	2+	3-	2	1+	12	1	0	1+	2+	3-	3-	2	1+	6	10	20	9	22	K	0.3
6	Q7A	1	0+	1-	3+	3	2+	1-	0+	12-	1+	0	1-	3	3	2	1	1	7	11	22	14	28		0.4
7	Q0A	1+	2+	2	3	3	2+	1	2	17	2	2	2	2+	3	2+	2-	2	9	13	24	16	21		0.5
8		1+	1-	1+	1+	5-	3+	5+	4	22	2-	1-	1+	1	4+	3+	5+	4	20	48	30	8	70		1.0
9		3-	3+	3-	3+	2+	2+	3+	3-	23-	2+	3-	2+	3	2+	2	3	2+	14	29	18	25	23		0.8
10		1-	1+	4+	3	4	2+	1+	0+	17+	1	1+	3+	3	4+	2	1+	1-	12	14	24	18	21		0.7
11	Q6A	1-	1+	2-	3	2-	2-	2	1+	13+	0+	1	2-	3-	2-	2	2	1+	7	14	15	14	15		0.3
12	Q2	1-	0	1+	1-	1	1-	1-	1-	6-	0+	0	1+	1-	1	0+	1-	1-	3	6	4	4	6	CK	0.1
13		3-	3	3+	2+	3-	2+	3-	2+	21+	2+	3-	3-	2+	3-	2+	3-	3-	12	21	25	26	20		0.7
14		3-	2+	2-	2-	3-	2+	3	3-	19	2+	2+	2-	1+	3-	2+	3	3-	10	17	20	12	25		0.6
15		3+	5-	4-	2+	2	2+	2+	4-	24+	3	4-	3	2	2	3-	3	3+	17	30	26	30	27		0.9
16		4+	4+	4-	2+	3-	4	3+	5-	29+	4-	4-	3+	2+	3-	4-	4-	5-	24	46	44	39	51		1.2
17	D5	4-	4+	4	2+	4	4+	5-	3	30+	3+	4-	4-	3	4	4-	4	3	25	42	37	31	48		1.2
18		4+	4+	3-	4+	3+	4+	3	3	29+	4-	4+	2+	4-	3	4	3-	3	24	32	39	39	32		1.1
19		3+	4-	2+	3	3+	3+	1+	3-	23	3+	3+	2-	3+	3+	3+	1+	3-	15	23	34	29	28		0.8
20		2+	2-	1+	2+	3-	2-	3	2+	17+	2	1+	1+	2	3	2-	2+	2+	9	19	14	11	23		0.5
21	Q8A	2+	3+	2	1+	2-	1	1-	2-	14	2	3-	2-	2-	2-	1	0+	2-	7	13	9	15	8	C	0.4
22		1	2	2	3	2+	2+	4-	4+	21-	1+	2	2+	3	2+	2	4-	4+	13	26	23	18	31		0.8
23		5-	3+	3	2+	3+	3-	1-	1-	21-	4+	3	3-	2+	3-	3-	1-	1	15	24	21	33	13		0.8
24	Q4K	0+	1+	2-	1	1+	1-	1+	3+	11	0+	1+	1+	1-	1+	1-	1+	3	6	15	9	10	14	KK	0.3
25	Q3	1+	1-	0+	0	0+	0+	1	2-	6-	1	1	0+	0	1-	0	1-	2	3	6	7	6	7	C	0.1
26	D2	5-	5-	3-	3	6	6-	7-	4	37+	5-	4	3-	2+	5	5-	5+	4-	49	58	47	36	70		1.6
27	D1	7-	6+	5+	5-	5	6	6	5+	45+	6-	5+	4+	4	5-	5-	5	5-	70	76	83	75	84		1.8
28		4	4-	3	3	4-	4-	2+	1+	25-	4-	3+	3-	3	4	3+	2	2-	17	22	29	28	23		0.9
29		2+	2+	3-	4-	3+	4-	2+	2+	23-	2+	2	3-	4-	3-	3	2-	2	14	22	28	27	23		0.8
30		3	3+	4-	4-	4-	3	1+	2	24-	3-	3-	3-	4-	4-	3-	1+	2	16	27	23	27	23		0.9
31	Q9A	1-	1-	0+	2	3+	3	3-	2	15-	0+	1-	0	2	3-	3-	2+	2	8	14	15	6	23		0.5
																		Mean	16	26.1	25.6	25.9			0.75

Day	Three-Hourly Indices Kn								Three-Hourly Indices Ks							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
1	3	3-	3-	5-	5-	5-	4+	4	3+	3+	2+	4-	4+	4	6-	5-
2	3+	3+	4	3	3	3+	4-	3-	4+	3	4-	3	3	3	4	4-
3	3	3	3-	3	3-	3-	3	3	4-	3-	2	3-	2+	3-	4-	3+
4	1	1-	0+	1-	0+	0	0	1-	1	1	0+	1-	0+	0	0	1-
5	1-	0	2-	2+	3-	3-	2-	1+	1	0+	1-	2+	2+	3	2	1+
6	1+	0	1-	3-	3-	2	1-	1-	1+	0	0+	3	3	2	1	1
7	2-	2	2	3-	3	2+	2-	2	2	2-	2	2+	3	2+	2	2
8	2-	1-	1+	1	5-	4-	5	4-	2-	1-	1+	1	4	3	5+	4
9	2	3-	2+	3+	2+	2	3+	3-	2+	3-	3-	3	2+	2	3-	2
10	1-	1-	4-	3	5-	2+	1+	1-	1	2	3-	3	4-	2-	1+	1-
11	0+	1	2	3-	2-	2-	2+	2-	1-	1+	1+	2+	2	2	2-	1
12	0+	0	1+	0+	1	0+	1-	1-	0+	0	1+	1+	1	0+	1-	1
13	2	3-	3-	2+	3-	2+	3	3-	2+	2+	3	2+	3-	2	3-	3
14	2+	2	2	1+	3-	2+	3	2+	2+	2+	2-	2-	3-	2+	3	3
15	3	4	3-	2+	2	3-	3-	3	3+	3+	3	2	2	3-	3+	4-
16	3+	4-	3+	2+	3-	3+	3	4	4	4-	3+	3-	3-	4	4	5
17	3+	4-	3+	3-	4+	4	4-	3	3+	4-	4-	3	4-	4-	4	3-
18	4-	4	2+	4-	3+	4-	3	3-	4	5-	2+	3+	3-	4	3-	3
19	3	3	2	3+	3+	3+	1+	3-	3+	3+	1+	3	3+	3+	1+	3-
20	2	2-	2-	2	3	2-	3-	2+	2	1	1-	2	3	2	2+	2+
21	2-	3	2-	2-	1+	1+	0+	2	2	2+	1+	2-	2-	1-	0	1+
22	1+	2	2	3+	3-	2+	3+	4	1+	2+	3-	3-	2+	2-	4-	4+
23	4	3	3	2+	2+	3	1-	1+	5-	3-	3-	3-	3-	2+	1-	1-
24	0+	1	1	1	2-	1	1+	3	0+	1+	1+	1-	1-	0+	1+	3
25	1	1-	0+	0	1-	0+	1+	2	1+	1+	0+	0	0+	0	0+	2
26	4+	4-	3-	3-	5+	5	5	4-	5-	4+	3	2	5-	4+	5+	4-
27	6-	5	4+	4+	5-	5-	5-	4+	6-	6-	5-	4	5-	5	5	5
28	3+	3	3-	3	4	4-	2+	2-	4	3+	3-	3+	4-	3	2	1+
29	2+	2-	3-	4-	3-	3+	2	2	2	2+	2+	4-	3-	3	1+	2
30	2+	3-	3-	4-	3+	3-	1	2+	3-	2+	3-	4	4	2+	1+	2-
31	0+	1-	0+	2	3	3-	3-	2	0+	1-	0	2	3-	3	2	2+

Quiet days (Q) and disturbed days (D), geomagnetic planetary three-hour-range indices (Kp) (integers alone are equivalent to those normally given with a small zero), magnetic character figures (Cp), and average amplitude (Ap) (unit 2γ) prepared by Geophysikalisches Institut at the University of Göttingen, F.R. of Germany for the International Service of Geomagnetic Indices. Ten most quiet days [Q1-Q0(10)] and five most disturbed days [D1-D5] are ordered from most quiet or disturbed, respectively. A or K means "not really quiet" (A = "Ap>6", K = "Ap ≤6 but one Kp ≥3o or two Kp values ≥3-"). An * means "not really disturbed" (Ap<20).

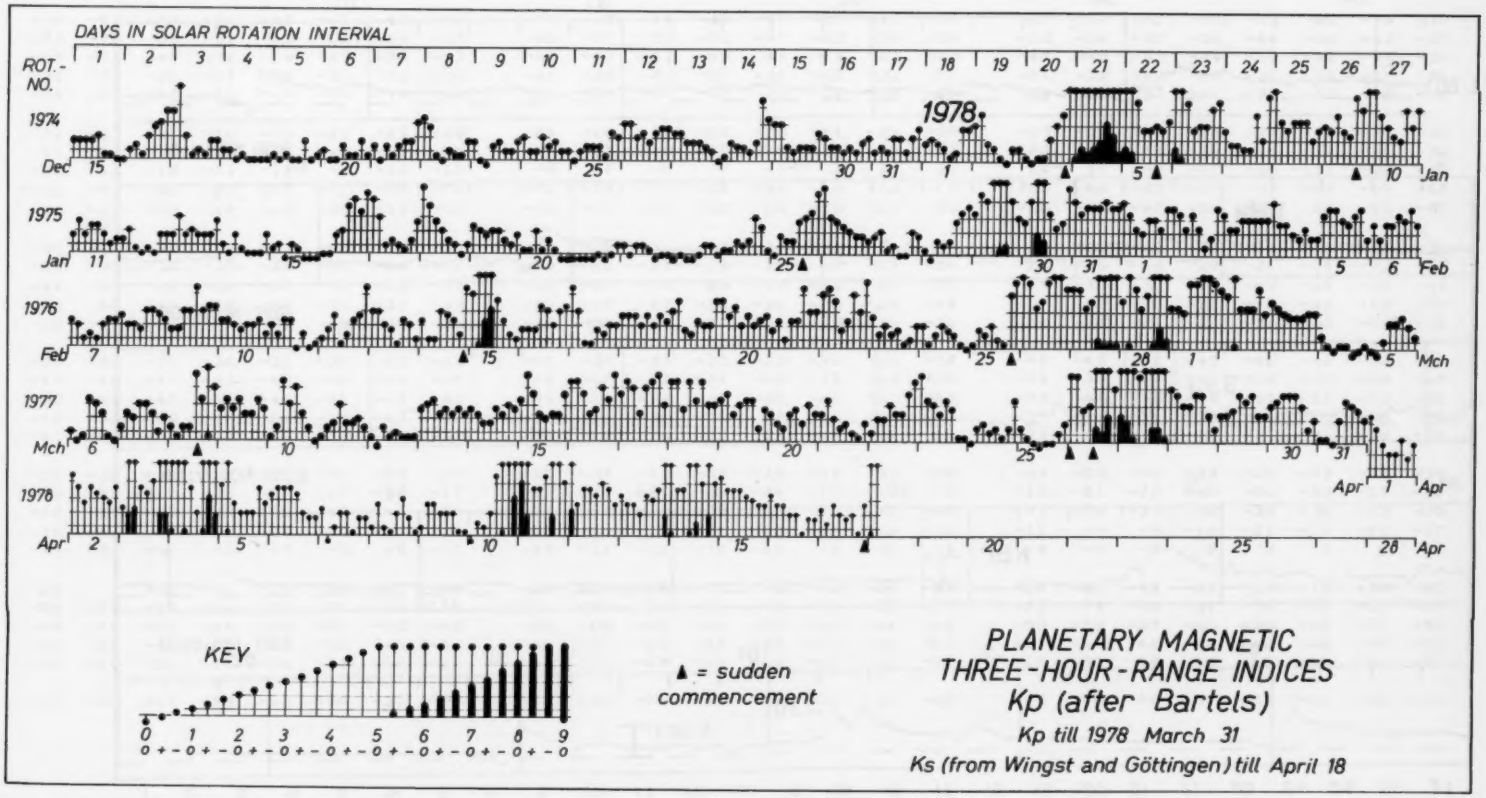
Geomagnetic three-hourly indices (Kn), (Ks) and (Km) as in IAGA-Bulletin No. 32 and indices (aa), "antipodal", as in IAGA-Bulletin No. 33 prepared by P. N. Mayaud of the Institut de Physique du Globe, Paris, France. Really quiet (C) and quiet but slightly disturbed three-hourly intervals (K) are given for 24-hour and 48-hour intervals centered on 12 UT.

DAILY AVERAGE INDICES Ap

1977 1978

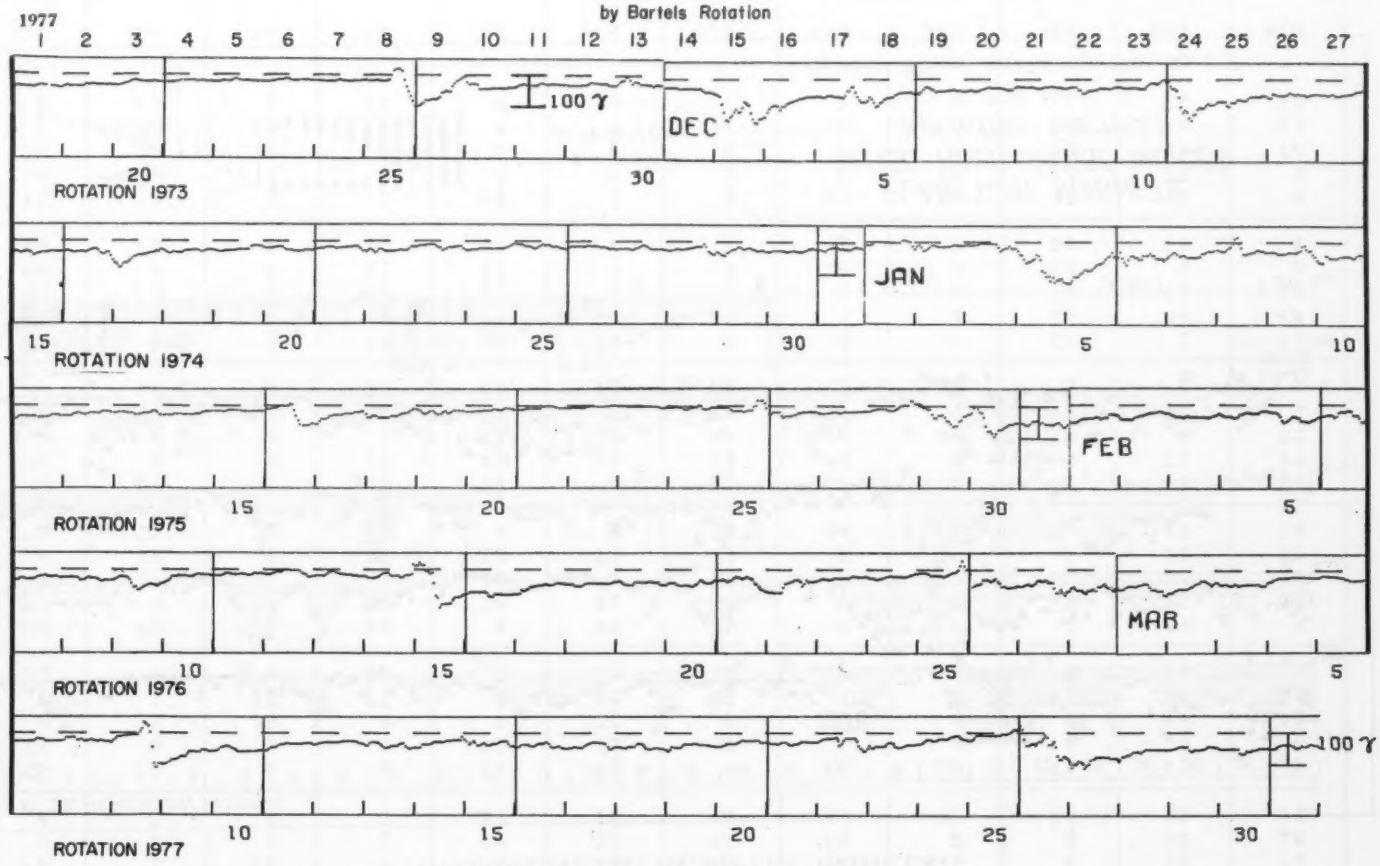
DAY	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
1	4	13	9	15	6	4	4	5	6	7	15	33
2	5	66	14	11	4	6	5	6	69	8	14	27
3	12	15	6	9	7	8	10	4	9	13	14	15
4	24	19	5	8	9	6	7	8	14	89	11	3
5	12	11	7	5	40	3	8	10	18	31	17	6
6	49	10	5	28	21	4	8	7	5	34	14	7
7	48	6	6	15	17	6	3	5	3	13	7	9
8	27	3	6	14	12	8	6	3	2	19	10	20
9	22	7	6	16	20	11	2	3	3	23	16	14
10	13	9	8	14	12	13	4	9	4	21	7	12
11	14	24	4	10	28	19	12	6	38	7	5	7
12	8	19	4	4	11	6	28	18	21	4	10	3
13	5	6	6	9	11	28	14	26	16	8	8	12
14	12	8	9	18	12	10	13	42	8	3	11	10
15	10	14	3	12	11	9	19	25	5	2	48	17
16	17	22	10	27	9	7	8	14	9	14	11	24
17	9	18	8	14	29	10	12	8	12	9	10	25
18	8	11	10	7	13	6	22	6	3	12	10	24
19	48	5	10	23	24	42	28	6	3	6	12	15
20	28	10	11	29	8	44	7	4	4	3	12	9
21	12	4	6	10	5	64	5	5	6	1	12	7
22	6	7	10	11	5	63	22	3	6	3	22	13
23	5	7	10	6	6	21	6	2	4	2	6	15
24	11	8	7	7	10	12	6	2	5	6	5	6
25	22	5	5	5	27	10	4	15	5	12	12	3
26	4	2	6	3	13	18	6	19	11	12	37	49
27	4	4	7	3	14	24	62	12	6	5	42	70
28	4	7	12	4	7	9	47	5	10	9	46	17
29	18	2	7	61	6	3	9	6	8	36		14
30	8	5	9	17	5	4	9	12	5	36		16
31		7		8	4		6		6	23		8
MEAN	16	11	8	14	13	16	13	10	10	15	16	16

GEOMAGNETIC ACTIVITY INDICES



GEOMAGNETIC ACTIVITY INDICES

Hourly Equatorial Dst



Note the sensitivity indicator for each month on the last day of the month and also note that the zero reference level is different for each month.

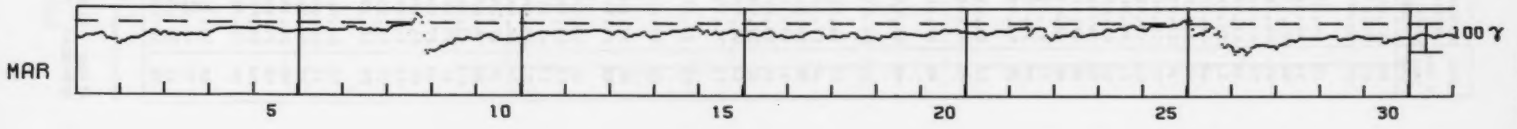
HOURLY EQUATORIAL Dst VALUES (PROVISIONAL)

MARCH 1978

NASA/GODDARD SPACE FLIGHT CENTER

(Time-UT) (Units-Gammas)

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	-58	-62	-58	-56	-52	-47	-48	-50	-49	-52	-44	-46	-41	-39	-45	-54	-62	-58	-62	-65	-62	-64	-76	-79
2	-70	-70	-66	-61	-59	-56	-58	-57	-60	-57	-53	-50	-47	-42	-39	-38	-32	-34	-32	-38	-44	-50	-42	-37
3	-41	-47	-48	-42	-44	-49	-50	-47	-42	-47	-51	-45	-44	-43	-43	-43	-46	-45	-42	-44	-50	-49	-49	-39
4	-35	-35	-30	-27	-25	-23	-23	-24	-22	-22	-23	-20	-21	-20	-22	-21	-21	-22	-22	-24	-24	-26	-25	-24
5	-24	-21	-17	-16	-19	-19	-19	-20	-21	-22	-24	-25	-26	-30	-29	-35	-35	-33	-33	-31	-32	-30	-28	-30
6	-29	-27	-27	-26	-28	-28	-29	-28	-26	-26	-29	-23	-18	-21	-22	-24	-28	-27	-26	-26	-27	-26	-25	-28
7	-28	-23	-15	-15	-15	-13	-17	-24	-22	-20	-28	-27	-26	-22	-20	-27	-30	-27	-23	-28	-30	-30	-30	-33
8	-24	-16	-12	-11	-12	-9	-10	-10	-7	-7	-5	-7	-7	2	12	31	24	16	-3	-47	-99	-111	-98	-99
9	-102	-97	-94	-89	-83	-81	-80	-76	-71	-73	-71	-63	-56	-56	-56	-60	-60	-56	-50	-55	-55	-59	-55	-58
10	-58	-54	-50	-44	-43	-40	-40	-42	-46	-51	-54	-60	-60	-58	-61	-58	-56	-56	-57	-56	-55	-54	-53	-55
11	-56	-54	-49	-44	-43	-43	-40	-37	-35	-35	-32	-33	-34	-34	-35	-35	-35	-33	-32	-32	-31	-31	-35	-38
12	-36	-35	-32	-30	-30	-29	-29	-28	-30	-29	-28	-29	-27	-26	-25	-24	-24	-25	-28	-29	-31	-34	-33	-37
13	-41	-40	-32	-28	-30	-32	-33	-37	-43	-48	-48	-44	-40	-40	-41	-38	-34	-31	-33	-43	-49	-52	-46	-47
14	-48	-48	-44	-35	-36	-36	-37	-33	-29	-27	-27	-26	-29	-28	-29	-22	-27	-22	-20	-22	-20	-22	-12	-20
15	-29	-37	-30	-24	-31	-40	-38	-35	-31	-38	-41	-37	-34	-33	-35	-30	-26	-24	-24	-28	-35	-43	-42	-45
16	-46	-45	-38	-36	-36	-37	-43	-44	-41	-37	-33	-35	-33	-29	-32	-37	-45	-48	-47	-42	-42	-48	-50	-51
17	-47	-48	-47	-43	-45	-49	-45	-45	-39	-35	-33	-31	-29	-30	-33	-33	-34	-35	-37	-44	-52	-53	-46	-43
18	-43	-44	-48	-49	-46	-41	-44	-42	-41	-34	-32	-34	-38	-47	-51	-53	-50	-47	-45	-49	-51	-51	-52	-54
19	-58	-52	-43	-47	-48	-47	-44	-37	-34	-34	-36	-34	-32	-34	-37	-38	-37	-39	-36	-40	-41	-43	-43	-44
20	-40	-42	-38	-36	-32	-32	-33	-35	-34	-29	-26	-22	-25	-27	-26	-23	-24	-22	-23	-26	-31	-29	-29	-32
21	-34	-36	-35	-33	-38	-34	-29	-29	-33	-37	-40	-38	-35	-34	-32	-28	-27	-28	-29	-32	-32	-29	-30	-28
22	-25	-23	-19	-18	-17	-17	-17	-17	-15	-24	-41	-35	-24	-17	-19	-19	-19	-21	-27	-43	-51	-59	-57	-50
23	-40	-50	-47	-42	-42	-42	-41	-40	-34	-30	-29	-35	-44	-46	-48	-44	-41	-38	-37	-38	-38	-38	-35	-35
24	-35	-32	-27	-21	-21	-23	-27	-26	-23	-18	-18	-21	-23	-18	-15	-12	-11	-9	-9	-16	-21	-24	-25	-27
25	-27	-24	-15	-9	-7	-9	-9	-10	-11	-11	-12	-12	-11	-8	-8	-4	-4	-6	-3	0	5	9	9	12
26	20	7	-23	-43	-39	-35	-35	-40	-33	-27	-26	-16	-8	-15	-39	-37	-27	-46	-73	-84	-83	-73	-78	-83
27	-96	-109	-95	-96	-88	-91	-96	-110	-101	-95	-85	-81	-75	-77	-73	-74	-77	-74	-76	-81	-79	-78	-81	-89
28	-83	-73	-72	-68	-69	-64	-60	-59	-58	-63	-63	-56	-52	-53	-54	-55	-55	-52	-53	-55	-55	-55	-51	-52
29	-52	-50	-48	-45	-43	-42	-46	-45	-46	-56	-61	-53	-53	-55	-54	-51	-51	-46	-42	-44	-46	-48	-47	-52
30	-54	-54	-54	-51	-52	-54	-54	-55	-51	-66	-69	-66	-58	-61	-62	-54	-55	-52	-48	-49	-48	-52	-52	-53
31	-50	-49	-48	-43	-40	-38	-37	-38	-36	-39	-43	-45	-49	-51	-45	-40	-45	-46	-40	-37	-39	-42	-42	-46



PRINCIPAL MAGNETIC STORMS

MARCH 1978

OBS. 2 letter IAGA code	GEOMAG-NETIC LATI-TUDE	COMMENCEMENT DAY	hr min (UT)	TYPE	SC - AMPLITUDES D(')	H(γ)	Z(γ)	MAXIMUM 3 HOUR - INDEX K DAY(3 HOUR PERIOD)	K	RANGES D(')	H(γ)	Z(γ)	UT END DAY	HOUR
HD	07.6N	1	0700	..	..	..	..	01(6)	5	4	108	26	02	21
HU	00.6S	1	1305	..	..	..	..	01(6,7,8)	5	8	247	36	02	21
HR	33.7S	1	0700	..	..	..	..	01(5,7,8)	5	25	63	93	02	02
CO	64.6N	8	1439	SC*	-14	+101	-24	08(7)	6	102	760	320	09	23
SI	60.0N	8	1441	SC*	- 7 *	+55	+10	10(5)	7	70	--	490	10	18
NE	55.1N	8	1439	SC	4	31	6	10(5)	6	34	164	181	10	18
WI	54.2N	8	1439	SC	- 8	+85		08(7)	6	32	195	60	08	23
FR	49.6N	8	1439	SC	+ 8	+15	-10	09(5)	5	26	100	49	10	21
IR	41.0N	8	1438	SC	- 2	92	15	08(5,7)	6	19	212	50	10	19
SJ	29.9N	8	1439	SC	+ 1	+29	+ 5	08(7)	7	9	167	57	09	00
GM	24.5N	8	1439	SC	- 1.5	61	- 5	--	-	8	215	42	10	00
HD	21.1N	8	1439	SC	+ 2	+12	+ 5	09(1)	6	12	35	7	10	20
JP	17.3N	8	1439	SC	- 2.3	55	-14	--	-	7	194	28	10	00
SH	14.6N	8	1439	SC	- 0.6	44	10	--	-	5	167	33	10	00
UJ	13.5N	8	1439	SC	- 1.4	62	-14	--	-	4	225	27	10	00
AL	09.5N	8	1439	SC	- 1.7	44	-14	08(7)	6	6	187	25	10	00
HD	07.6N	8	1438	SC	- 1.1	+50	- 2	08(7)	7	4	207	16	09	23
GU	04.0N	8	1439	SC	--	37	-11	08(7)	6	--	120	20	09	11
AN	01.5N	8	1439	SC	- 2.6	58	33	--	-	5	200	69	10	00
HU	00.6S	8	1439	SC*	5	177	14	08(7)	7	8	265	30	09	01
TV	01.1S	8	1439	SC	- 0.6	45	57	--	-	2	192	127	10	00
HR	33.7S	8	1440	SC	+ 4	+35	+28	08(7)	7	19	194	208	09	06
KG	56.5S	8	1439	SC*	--	--	--	08(7)	7	--	--	--	09	11
CO	64.6N	10	07--	..	..	..	..	10(5)	7	181	1160	830	10	15
HD	07.6N	10	0530	..	..	..	..	10(5)	5	3	154	34	10	21
HD	07.6N	13	0532	SC	- 0.1	+13	- 3	13(5)	4	3	121	31	13	22
NE	55.1N	14	19--	..	..	..	..	15(2) 17(2)	5	30	137	116	20	04
CO	64.6N	15	03--	..	..	..	..	17(4,6) 18(4,6) 19(4)	6	240	1250	780	19	18
GM	24.5N	16	0100	..	..	..	..	--	-	7	77	46	18	00
JP	17.3N	16	0100	..	..	..	..	--	-	6	79	40	18	00
SH	14.6N	16	0100	..	..	..	..	--	-	5	69	28	18	00
UJ	13.5N	16	0100	..	..	..	..	--	-	5	90	35	18	00
AL	09.5N	16	0100	..	..	..	..	16(7,8) 17(3,7)	4	5	96	28	18	00
HD	07.6N	16	0000	..	..	..	..	16(6)	5	5	111	28	17	22
AN	01.5N	16	0100	..	..	..	..	--	-	4	149	67	18	00
TV	01.1S	16	0100	..	..	..	..	--	-	2	192	82	18	00
HR	33.7S	17	1800	..	..	..	..	18(2)	5	20	74	50	18	15
HD	07.6N	18	0200	..	..	..	..	19(5,6)	5	4	103	19	19	18
HD	07.6N	22	0800	SC	- 0.1	+ 6	- 1	23(5)	5	5	122	25	23	19
KG	56.5S	22	1006	SC*	--	--	--	22(8)	6	--	--	--	23	03
NE	55.1N	25	2206	..	..	..	..	26(6) 27(1,2,4)	6	46	235	335	31	01
FR	49.6N	25	22--	..	..	..	..	27(1)	7	40	145	101	30	15
IR	41.0N	25	22--	..	..	..	..	26(1,4) 27(5)	6	28	179	54	28	18
SJ	29.9N	25	2200	..	..	..	..	26(1)	6	12	126	39	28	05
GM	24.5N	25	2200	..	..	..	..	--	-	9	150	51	28	00
JP	17.3N	25	2200	..	..	..	..	--	-	8	140	40	28	00
SH	14.6N	25	2200	..	..	..	..	--	-	6	145	38	28	00
UJ	13.5N	25	2200	..	..	..	..	--	-	7	144	38	28	00
AL	09.5N	25	2200	..	..	..	..	26(5)	6	7	141	37	28	00
HD	07.6N	25	2200	..	..	..	..	26(5,6,7)	6	6	161	25	28	20
GU	04.0N	25	2208	..	..	..	..	26(1)	6	10	300	40	28	16
AN	01.5N	25	2200	..	..	..	..	--	-	5	193	71	28	00
TV	01.1S	25	2200	..	..	..	..	--	-	4	227	121	28	00
PM	18.7S	25	2208	..	..	..	..	26(1,5,6,7) 27(1,2,4)	5	5	160	90	28	18
CO	64.6N	26	00--	..	..	..	..	27(4)	7	211	1560	910	30	17
SI	60.0N	26	0010	SC	+ 4	-21	- 6	27(4)	7	--	--	510	28	20
HI	54.2N	26	1334	SC*	+ 9 *	-110 *		26(5) 27(6,7,8)	6	40	200	115	28	01
HO	21.1N	26	1334	SC	- 2	- 8	- 4	27(1)	6	15	40	8	28	22
HO	21.1N	26	0012	SC	+ 1	+ 6	+ 3	26(1)	7	2	40	3	26	10
HU	00.6S	26	0012	SC	1	23	4	26(5)	7	9	429	46	27	22
HR	33.7S	26	1332	SC	- 6	-30	-28	26(5,6,7) 27(1,2,3,6,7,8)	5	30	122	141	28	09
GN	43.3S	26	00--	..	..	..	..	26(7) 27(5)	6	28	70	140	28	16
TO	46.7S	26	1340	SC	+ 1	-53	+10	26(7) 27(2,3,4,5,8)	5	22	214	109	28	00
KG	56.5S	26	0013	SC	--	--	--	26(1)	5	--	--	--	26	09
KG	56.5S	26	1334	SC*	--	--	--	26(7) 27(1,6)	7	--	--	--	28	05

Reports were received from the following observatories:

Alibag Annamalainagar College Fredericksburg Gnangara Guam Gulmarg Hermanus Honolulu Huancayo Hyderabad Irkutsk Jaipur Kerguelen Newport Port Moresby San Juan Shillong Sitka Toolangi Trivandrum Ujjain Witteveen

RADIO PROPAGATION QUALITY INDICES

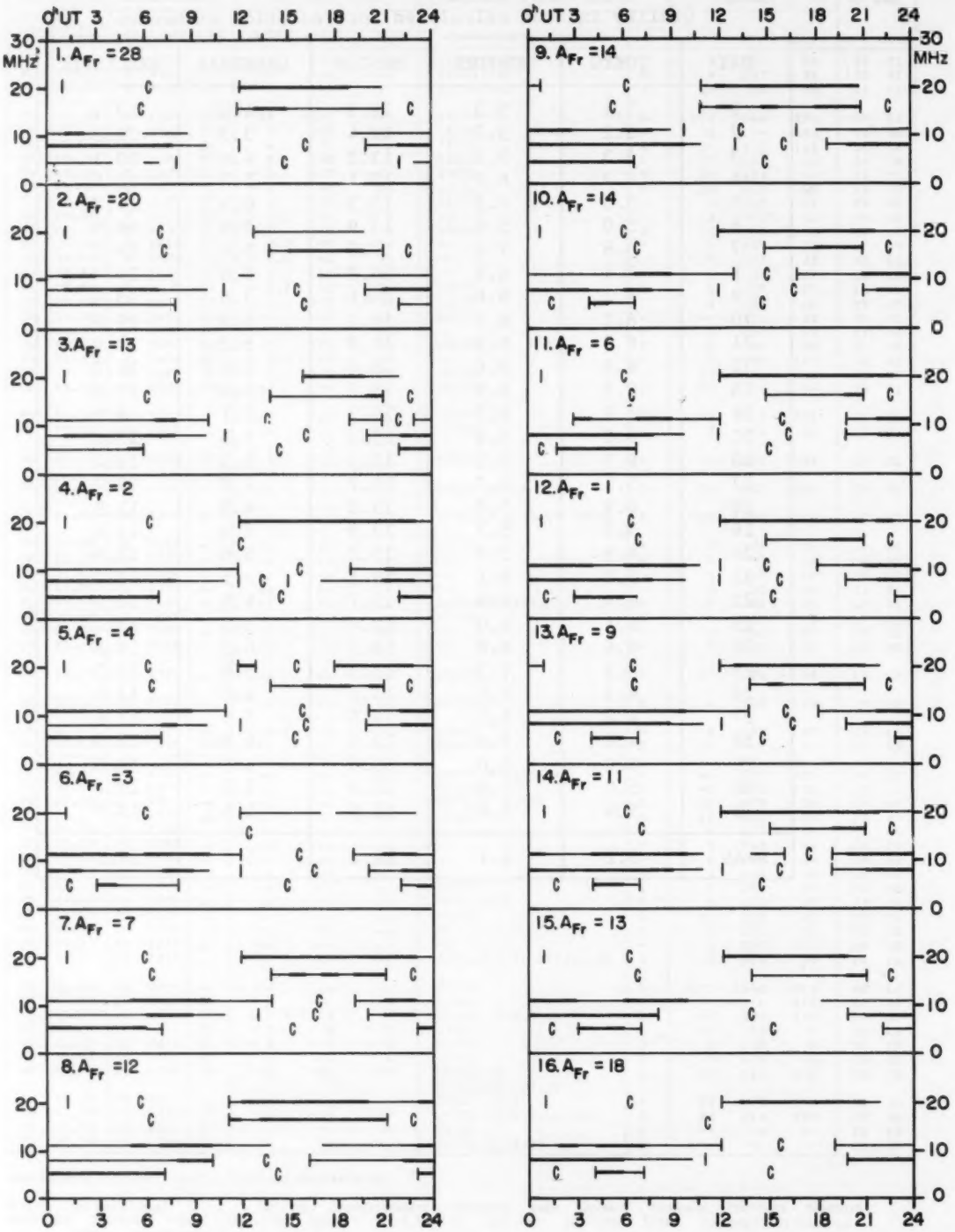
MARCH 1978

Quality indices calculated for reception at Lüchow

DAY	TOKYO	NORFOLK	MOSCOW	CANBERRA	BRACKNELL
1	3.1	5.3	12.3	4.0	12.1
2	2.2	5.7	12.4	3.3	11.5
3	4.3	5.2	13.2	4.6	13.1
4	4.3	6.8	13.1	5.3	13.5
5	5.5	6.2	13.3	6.3	14.2
6	5.0	5.9	13.9	6.4	14.5
7	4.8	7.4	13.8	6.4	14.7
8	7.1	6.9	14.0	5.8	14.4
9	4.1	6.6	13.1	3.8	13.4
10	6.1	6.1	14.1	6.3	14.3
11	6.8	6.3	14.0	6.2	14.4
12	6.6	6.6	13.4	6.6	14.2
13	5.3	6.9	13.2	6.4	13.8
14	4.9	6.7	13.3	5.1	14.0
15	6.0	5.8	13.5	5.3	12.2
16	6.3	6.1	12.5	5.3	11.4
17	5.1	5.7	13.2	4.8	12.2
18	4.9	5.8	13.5	4.5	11.9
19	5.2	5.7	12.9	5.3	13.4
20	4.9	5.9	13.2	5.6	13.9
21	5.0	6.1	13.1	5.5	13.2
22	6.4	6.3	13.7	4.6	12.9
23	6.1	6.0	12.4	5.3	13.1
24	6.6	6.8	13.5	6.3	13.8
25	6.3	7.3	13.3	5.9	12.5
26	4.5	6.8	13.7	4.7	12.4
27	4.4	4.3	12.5	3.8	12.6
28	4.8	5.0	13.4	4.5	12.6
29	5.6	6.0	13.5	5.3	13.0
30	5.0	5.8	12.4	5.3	12.8
31	5.4	5.8	12.9	5.6	13.0
MEAN	5.2	6.1	13.2	5.3	13.2

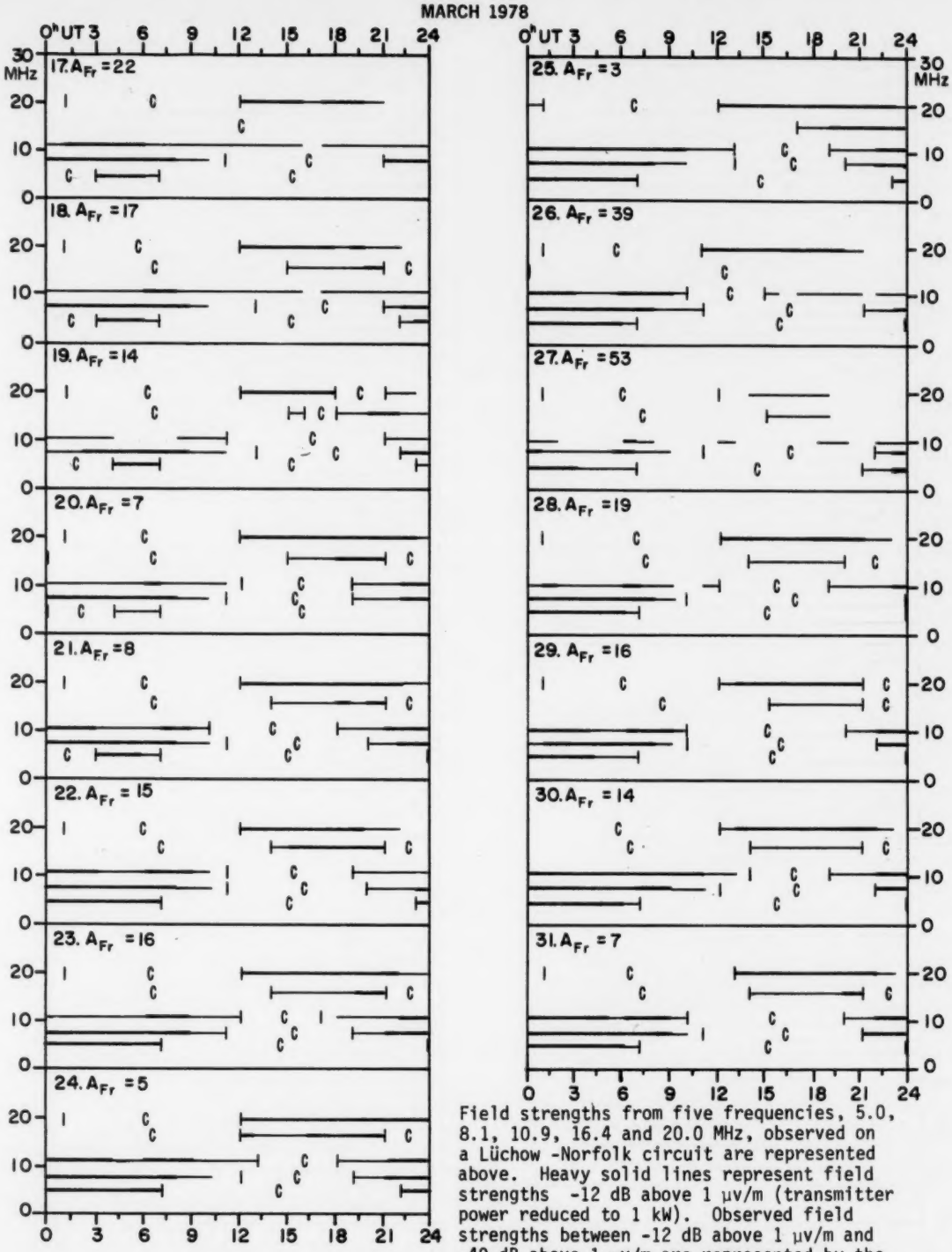
TRANSMISSION FREQUENCY RANGES -- NORTH ATLANTIC PATH

MARCH 1978



TRANSMISSION FREQUENCY RANGES -- NORTH ATLANTIC PATH

MARCH 1978



Field strengths from five frequencies, 5.0, 8.1, 10.9, 16.4 and 20.0 MHz, observed on a Lüchow -Norfolk circuit are represented above. Heavy solid lines represent field strengths -12 dB above 1 μv/m (transmitter power reduced to 1 kW). Observed field strengths between -12 dB above 1 μv/m and -40 dB above 1 μv/m are represented by the fine line. Adapted from Observations by Deutsche Bundespost

USCOMM-NOAA-ASHEVILLE, NC--5-78--950

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Explan

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No 405, pt 2

MAY 1978 Number 405 - Part II

JUN 15

Solar-Geophysical Data comprehensive reports

Data for November 1977 -- October 1977 & Miscellanea
Explanation of Data Reports Issued as Number 402 (Supplement) February 1978

noaa NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION / ENVIRONMENTAL DATA SERVICE / BOULDER, COLORADO

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Solar - Geophysical Data

NO. 405 MAY 1978

Part II (Comprehensive Reports)

DATA FOR
NOVEMBER 1977
OCTOBER 1977
& MISCELLANEA

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To standardize referencing these reports in the open literature, the following format is recommended:

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SOLAR-GEOPHYSICAL DATA

No. 405

Issued in two parts

Helen E. Coffey, Editor

J. Virginia Lincoln, Director
Solar-Terrestrial Data Services Division

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C.6	Sudden Ionospheric Disturbances	398A106	399A100	400A100	401A101	402A106	403A115	404A105	405A120	
D.	GEOMAGNETIC AND MAGNETOSPHERIC PHENOMENA									
D.1a	Geomagnetic Indices Kp, Kn, Ks, Km, Ap, aa, Cp	398A117	399A120	400A113	401A109	402A125	403A142	404A139	405A151	
D.1ba	27-day Chart of Kp Indices	398A119	399A122	400A115	401A111	402A127	403A144	404A141	405A153	
D.1c	27-day Chart of C9	404A142	404A142	404A142	404A142	404A142				
D.1d	Principal Magnetic Storms	398A122	399A125	400A118	401A114	402A130	403A145	404A143	405A156	
D.1e	Reduced Magnetograms								405A 39	
D.1f	Sudden Commencement and Solar Flare Effects	398A123	399A126	400A119	401A115	403B 69	403A147	405B 55		
D.1g	Equatorial Indices Dst	398A121	399A124	400A117	401A113	402A129	405B 53	405B 54	405A155	
F.	COSMIC RAYS									
F.1a	Cosmic Ray Neutron Counts (Deep River)	398A116	399A115	400A112	402B 47	402A124	403A138	404A138	405A150	
F.1b	Cosmic Ray Neutron Counts (Climax)	398A116	399A115	400A112	401A108	402A124				
F.1e	Cosmic Ray Neutron Counts (Alert)	398A116	399A115	400A112	402B 47	402A124	403A138	404A138	405A150	
F.1f	Cosmic Ray Neutron Counts (Calgary)	400B 70	400B 70	402B 47						
F.1g	Cosmic Ray Neutron Counts (Sulphur Mountain)	400B 70	---	402B 47						
F.1h	Cosmic Ray Neutron Counts (Thule)									
F.1i	Cosmic Ray Neutron Counts (Kiel)	398A116	399A115	400A112	401A108	402A124	403A138	404A138	405A150	
F.1j	Cosmic Ray Neutron Counts (Tokyo)	398A116	399A115	400A112	401A108	402A124	403A138	404A138	405A150	
F.1k	Cosmic Ray Neutron Counts (Kula)	398A116								
H.	MISCELLANEOUS									
H.60	IUWDS Alert Decisions	397A 4	398A 4	399A 4	400A 4	401A 4	402A 5	403A 5	404A 4	405A 4
H.62	Abbreviated Calendar Record	403B 46	404B 46	405B 30						

Notes:

"398A 36" listed under 1977 Aug means that data for August 1977 were contained in *Solar-Geophysical Data* Number 398 - Part I, beginning on page 36.

A = Part I, B = Part II.

----- = no data available.
blank = data not yet received.

NOVEMBER 1977 DATA

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ACTIVE REGIONS

CARRINGTON ROTATION 1661

(October 27 - November 24, 1977)

Region No.	Coordinates		Age at CMP	Imp.	Spot-less Region	Region No. in Rotation 1660	Activity at West Limb
	Lat.	Long.					
1	19°N	352°	>6	1	x		dispersed
2	17 N	351	>6	1	x		disappeared
3	18 S	346	-1	1	x		stable
4	17 S	341	+2	1	x		decreasing
5	21 N	330	>6	1	x		decreasing
6	32 N	328	>6	1	x	(2)	decreasing
7	32 N	328	+3	2			decreasing
8	22 N	300	>6	1	x	(5)	dispersed
9	21 N	297	>6	1	x	(6)	dispersed
10	23 S	269	>6	3			decreasing
11	20 N	252	>6	3			decreasing
12	20 N	241	0	1	x		disappeared
13	9 N	212	>6	1	x		decreasing
14	20 N	206	>6	1	x	(11 + 12)	dispersed
15	8 N	202	>6	1	x	(13)	decreasing
16	26 S	189	-4	1	x		increasing
17	26 N	167	>6	1	x	(18)	dispersed
18	21 N	150	>6	1	x	(20)	decreasing
19	23 S	147	+5	2			decreasing
20	30 N	137	>6	1	x		dispersed
21	24 N	136	>6	2		(21)	decreasing
22	25 S	135	-1	1	x		dispersed
23	13 N	103	-3	1	x		decreasing
24	27 N	103	>6	1	x		dispersed
25	6 N	99	-2	1	x		disappeared
26	13 N	90	-4	1	x		stable
27	25 S	80	>6	1	x	(29)	dispersed
28	38 N	76	>6	2			decreasing
29	27 S	66	0	1	x		dispersed
30	24 N	63	+4	4			decreasing
31	31 N	63	+5	1	x		disappeared
32	22 N	53	>6	1	x		dispersed
33	18 S	46	>6	2			dispersed
34	22 N	41	>6	1	x		dispersed
35	25 S	38	+4	1	x		disappeared
36	15 N	35	-3	1	x		decreasing
37	15 N	29	>6	2			decreasing
38	25 N	27	-1	2			decreasing
39	31 N	18	>6	1	x		decreasing

ACTIVE REGIONS

ACTIVE REGIONS

CARRINGTON ROTATION 1662

(November 24 - December 21, 1977)

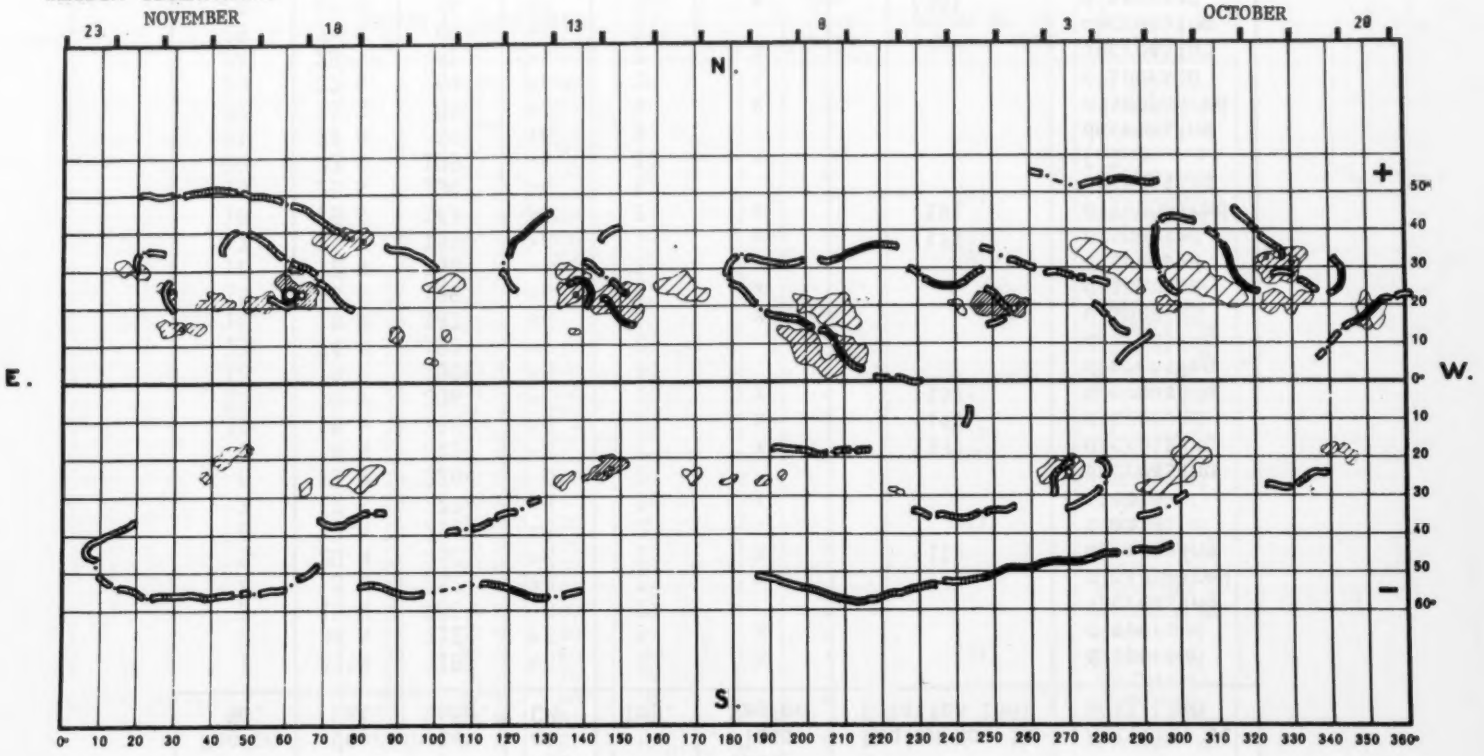
Region No.	Coordinates Lat.	Coordinates Long.	Age at CMP	Imp.	Spot-less Region	Region No. in Rotation 1661	Activity at West Limb
1	35°N	318°	>6	1	x		dispersed
2	34 N	312	>6	1	x		dispersed
3	15 N	285	0	2			increasing
4	3 N	252	+4	1	x		disappeared
5	20 N	252	>6	1	x	(11)	decreasing
6	13 N	251	-2	2			stable
7	17 S	227	-3	1	x		stable
8	17 N	226	0	2			decreasing
9	8 N	221	>6	1	x	(13)	decreasing
10	19 N	213	>6	1	x	(14)	dispersed
11	10 N	206	>6	1	x	(15)	decreasing
12	19 S	202	>6	4			decreasing
13	24 S	189	>6	2			decreasing
14	18 N	187	+6	1	x		dispersed
15	28 N	168	>6	1	x		dispersed
16	2 N	160	-1	1	x		dispersed
17	25 N	155	>6	1	x	(17)	dispersed
18	25 S	143	>6	1	x	(19)	disappeared
19	25 S	134	>6	5			decreasing
20	23 N	109	-5	1	x		(?)
21	24 N	89	+6	3			decreasing
22	23 S	84	+2	1	x		disappeared
23	22 S	69	>6	1	x		dispersed
24	28 S	61	>6	1	x		decreasing
25	24 S	60	+1	2			decreasing
26	25 N	56	>6	1	x	(30)	dispersed
27	37 N	53	>6	1	x		dispersed
28	16 N	45	>6	2			decreasing
29	16 N	34	>6	1	x	(36+37)	decreasing
30	13 S	23	+3	1	x		dispersed
31	20 N	17	0	1	x		disappeared

SYNOPTIC SOLAR MAP

CARRINGTON ROTATION 1661

OCTOBER 27 TO NOVEMBER 24, 1977

MEUDON OBSERVATORY

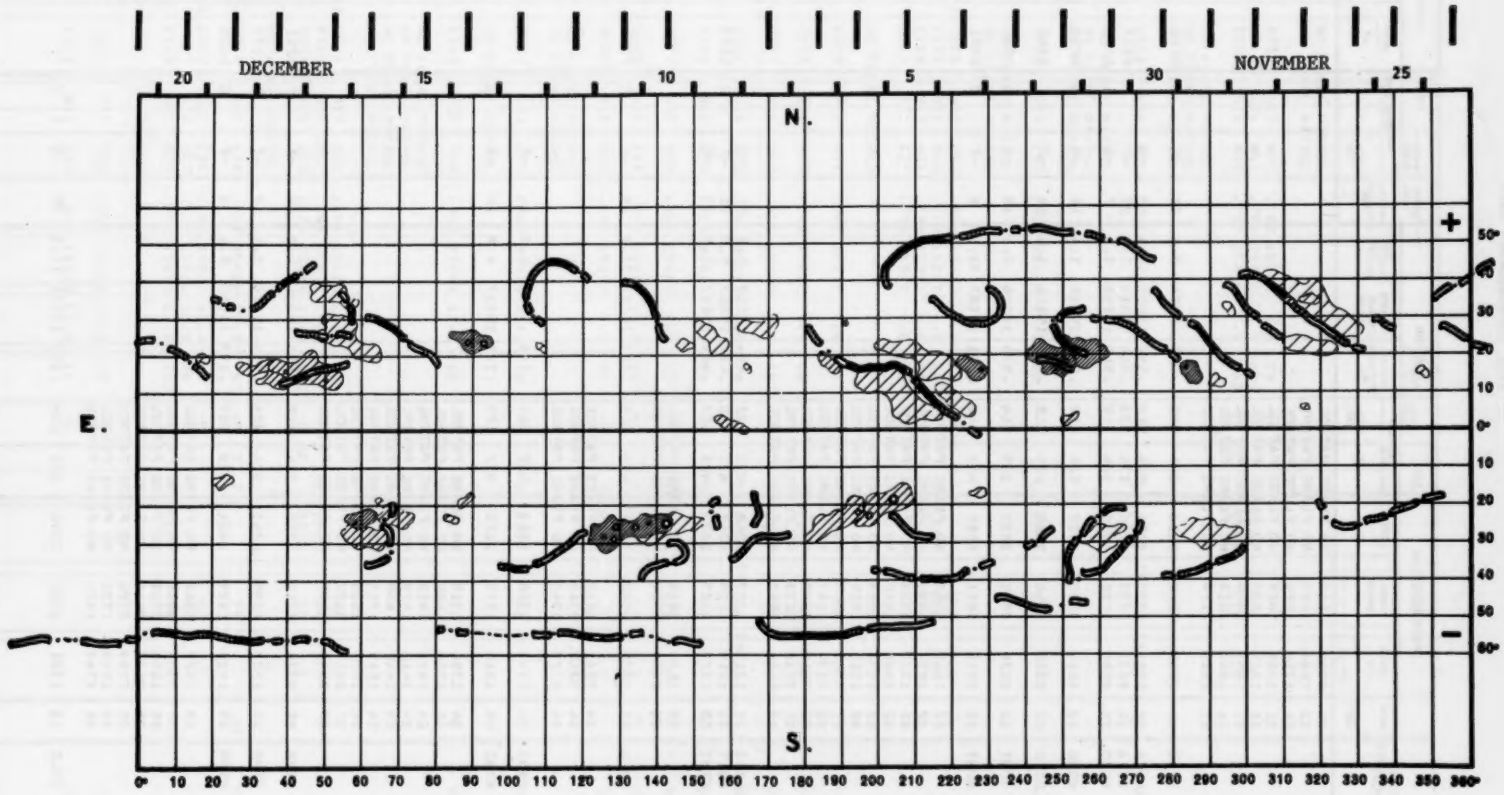


SYNOPTIC SOLAR MAP

CARRINGTON ROTATION 1662

NOVEMBER 24 TO DECEMBER 21, 1977

MEUDON OBSERVATORY



7 Nov 77

Hα SOLAR FLARES

NOVEMBER 1977

OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IMPOR-TANCE	OBS.		MEASUREMENTS			REMARKS	
	DATE * NOV	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY	MIN.		CONF	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.		
	01	1515	1619	NO FLARE PATROL														
	01	1651	1659	NO FLARE PATROL														
	01	1714	1800	NO FLARE PATROL														
	01	1803	1823	NO FLARE PATROL														
	01	1824	1839	NO FLARE PATROL														
	01	1847	1944	NO FLARE PATROL														
	01	1947	2023	NO FLARE PATROL														
	01	2109	2114	NO FLARE PATROL														
975 CULG	01	2207	2212	2228	S24	E20	.566	15016	3.4	21	-F		C	2212	20	.2		Y5
GRP64976	02	0031+1	0032+1	0050	S24	E19	.557	15016	3.4	19	-N				30	.4	DJ	
CULG	02	0031	0033	0100	S24	E20	.564	15016	3.5	29	-F		C	0033	30	.3		
VORO	02	0032	0032	0039	S24	E18	.549	15016	3.4	7	-B		C	0032	27	.3	DJ	
977 VORO	02	0204	0209	0222	S24	E18	.549	15016	3.4	18	-N		C	0209	54	.6	DH	Y5
978 CULG	02	0336	0340	0356	S25	E18	.561	15016	3.5	20	-F		C	0340	15	.2		Y5
979 MONT	02	0828	0832	0838	S25	E14	.534	15016	3.4	10	-F		C	0832	40		E	Y5
980 MONT	02	0849	0851	0855	N31	W40	.721	15008	30.4	6	-F		C	0851	40		D	Y5
	02	1145	1155	NO FLARE PATROL														
	02	1257	1300	NO FLARE PATROL														
	02	1320	1322	NO FLARE PATROL														
	02	1408	1452	NO FLARE PATROL														
	02	1458	1508	NO FLARE PATROL														
	02	1510	1525	NO FLARE PATROL														
	02	1540	1548	NO FLARE PATROL														
	02	2134	2147	NO FLARE PATROL														
	02	2213	2223	NO FLARE PATROL														
	02	2230	2233	NO FLARE PATROL														
	03	0536	0552	NO FLARE PATROL														
GRP64981	03	1219+1	1227+2	1240	N20	E20	.424	15017	5.0	21	-F						E	
MONT	03	1219	1229	1240	N20	E20	.424	15017	5.0	21	-F		C	1229	60		E	
KANZ	03	1220	1227	1239	N20	E20	.424	15017	5.0	19	-F						E	
	03	1525	2019	NO FLARE PATROL														
	03	2020	2034	NO FLARE PATROL														
982 CULG	03	2255	2302	2310	N30	W63	.903	15008	30.2	15	-F		C	2302	50			Y5
	04	0141	0142	NO FLARE PATROL														
	04	0243	0248	NO FLARE PATROL														
	04	0329	0340	NO FLARE PATROL														
983 KANZ	04	0949	0956	1003	N22	E05	.318	15017	4.8	14	-F						D	Y5
984 KANZ	04	1014	1022	1028	N22	E05	.318	15017	4.8	14	-F							Y5
	04	1304	1310	NO FLARE PATROL														
	04	1350	1405	NO FLARE PATROL														
	04	1410	1412	NO FLARE PATROL														
	04	1418	1420	NO FLARE PATROL														
	04	1440	1455	NO FLARE PATROL														
	04	1510	1718	NO FLARE PATROL														
	04	1837	2030	NO FLARE PATROL														
	05	0114	0122	NO FLARE PATROL														
	05	0552	0605	NO FLARE PATROL														
985 HTPR	05	0736	0741	0750	S24	W18	.545	15016	4.0	14	-F		C	0741	10	.1		Y5
986 HTPR	05	1229	1235	1241	S24	W21	.569	15016	3.9	12	-F		C	1235	10	.1		Y5
987 HTPR	05	1425	1428	1434	N20	W07	.299	15017	5.1	9	-F		C	1428	20	.2		Y5
	05	1529	1540	NO FLARE PATROL														
	05	1541	1829	NO FLARE PATROL														
	05	1854	2003	NO FLARE PATROL														
	05	2130	2144	NO FLARE PATROL														
	05	2159	2226	NO FLARE PATROL														
	06	1508	1732	NO FLARE PATROL														
	06	1740	1824	NO FLARE PATROL														
988 PALE	06	1921	1922	1946	N22	E64	.902	15024	11.6	25	-N	3	V		35		U F	Y5

Hα SOLAR FLARES

NOVEMBER 1977

OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IMPOR-TANCE	OBS.		MEASUREMENTS			REMARKS	
	DATE NOV	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY	MIN.		CONC	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.		
	07	0301	0309	NO FLARE PATROL														
	07	0322	0327	NO FLARE PATROL														
GRP64989	07	0531	0607	0830D	S23	W45	.782	15016	3.9	179	1N						U	
CULG	07	0531	0607	0718D	S24	W45	.786	15016	3.9	1070	1N		C	0607	200	3.2	U	
CATA	07	0705E	0705	0830D	S23	W45	.782	15016	3.9	850	1N	2		0705	252	4.1		
	07	1515	1706	NO FLARE PATROL														
	07	2058	2059	NO FLARE PATROL														
	07	2105	2111	NO FLARE PATROL														
990 CULG	07	2355	2401	0008	N25	W36	.651	15017	5.3	13	-F		C	2401	60	.8	L	Y5
	08	0139	0144	NO FLARE PATROL														
	08	0157	0245	NO FLARE PATROL														
	08	0300	0309	NO FLARE PATROL														
991 CULG	08	0451	0456	0523	S23	E64	.926	15026	13.0	32	-N		C	0456	70			Y5
	08	0649	0701	NO FLARE PATROL														
	08	0725	0732	NO FLARE PATROL														
GRP64992	08	1057+4	1105+1	1118	N22	W50	.786	15017	4.7	21	1N				180	3.0	H	
LVOV	08	1057	1105	1121	N21	W49	.773	15017	4.8	24	1F		C	1105	150	2.6		
HONT	08	1058	1106	1118	N23	W51	.798	15017	4.6	20	1N		C	1106	220		H	
KANZ	08	1101	1105	1112	N21	W51	.793	15017	4.6	11	1N							
	08	1544	1957	NO FLARE PATROL														
993 CULG	08	2039	2042	2045	N22	W57	.849	15017	4.6	6	-F		C	2042	40	.8		Y5
994 CULG	08	2050	2053	2100	N21	W55	.830	15017	4.7	10	-F		C	2053	30	.6		Y5
995 CULG	08	2256	2300	2310	N21	W59	.864	15017	4.5	14	-N		C	2300	30	.6		Y5
996 CULG	08	2335	2340	2343	N22	W59	.866	15017	4.6	8	-N		C	2340	60	1.2		Y5
997 CULG	09	0046	0110	0140	N22	W53	.815	15017	5.1	54	-N		C	0110	60	1.0	L	Y5
998 CULG	09	0301	0305	0312	N22	W59	.866	15017	4.7	11	-F		C	0305	20	.4		Y5
999 CULG	09	0339	0402	0440	N24	E60	.877	15017	13.7	61	-N		C	0402	40	1.2	F	Y5
0 CULG	09	0347	0424U	0445	N18	W63	.893	15017	4.4	58	-F		C	0424	15	.3		Y5
	09	0700	0705	NO FLARE PATROL														
	09	0725	0747	NO FLARE PATROL														
1 HONT	09	0847	0852	0903	S23	E48	.807	15026	13.0	16	-F		C	0852	40		E	Y5
	09	0941	0950	NO FLARE PATROL														
2 HONT	09	1124	1129	1149	S25	E48	.815	15026	13.1	25	-F		C	1129	20		D	Y5
	09	1420	1845	NO FLARE PATROL														
	09	2109	2220	NO FLARE PATROL														
	10	0215	0227	NO FLARE PATROL														
	10	0316	0350	NO FLARE PATROL														
GRP65003	10	0834	0847+3	0918	N25	E18	.464	15024	11.7	44	-F				45	.5	E	
HTPR	10	0834	0847	0918	N25	E17	.455	15024	11.6	44	-F		C	0847	30	.3	E	
CATA	10	0845E	0850	0900D	N25	E19	.474	15024	11.8	150	-N	2		0850	56	.6		
	10	1557	1954	NO FLARE PATROL														
4 PALE	10	1754	1754	1759	S22	E30	.627	15026	13.0	5	-F	3	C		26		DE	Y5
GRP65005	10	2057	2124+1	2135	S22	E26	.587	15026	12.8	38	-F				40	.5		
PALE	10	2057	2124	2125	S22	E27	.597	15026	12.9	28	-N	3	C		45			
CULG	10	2123E	2125	2145	S22	E26	.587	15026	12.8	220	-F		P	2125	30	.4		
	10	2116	2123	NO FLARE PATROL														
6 KANZ	11	1004	1020	1024	N37	E86	.996	15028	17.9	20	-F							Y5
7 KANZ	11	1159	1206	1210	N37	E86	.996	15028	17.9	11	-F							Y5

Hα SOLAR FLARES

NOVEMBER 1977

OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IMPOR-TANCE	OBS.		MEASUREMENTS			REMARKS	
	DATE	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY			COND	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.		
	NOV									MIN.								
GRP65008	11	1235+0	1239+2	1309	N25	E02	.371	15024	11.7	34	1N						GU	
ZUFI	11	1235	1239	1311	N25	E02	.371	15024	11.7	36	-F		C	1239	60	.7		
KANZ	11	1235	1241	1307	N26	E02	.387	15024	11.7	32	1N						G	
CATA	11	1255E	1255	1305D	N24	E02	.354	15024	11.7	100	1N	2		1255	196	2.1	U	
9 KANZ	11	1417	1431	1434D	N23	E28	.552	15025	13.7	17D	-N							Y5
GRP65010	11	1442E		1508	N23	E30	.574	15025	13.9	26	-N						E	
HTPR	11	1442E		1505	N23	E30	.574	15025	13.9	23D	-F		C	1443	20	.2		
CATA	11	1445E	1445	1510	N22	E27	.532	15025	13.6	25D	1N	2		1445	168	2.0		
11 HTPR	11	1518	1511	1519	N20	E17	.399	15025	12.9	9	-F		C	1511	10	.1		Y5
	11	1542	1843	NO FLARE PATROL														
	11	1906	1949	NO FLARE PATROL														
GRP65012	12	0800+0	0805	0845	N25	W10	.404	15024	11.6	45	-F						E	
BUCA	12	0800		0850	N26	W10	.418	15024	11.6	50	-F		C	0815	43	.5	E	
CATA	12	0800E	0805	0840	N25	W10	.404	15024	11.6	40D	-N	1		0805	56	.6		
13 BUCA	12	0819	0824	0840	S24	E08	.474	15026	12.9	21	-N		C	0824	107	1.2		Y5
14 CATA	12	1335	1335	1345	N39	E68	.945	15028	17.7	10	-N	1		1335	28			Y5
	12	1625	1706	NO FLARE PATROL														
	12	1710	1724	NO FLARE PATROL														
	12	1740	1843	NO FLARE PATROL														
	12	1906	1916	NO FLARE PATROL														
	12	1919	1952	NO FLARE PATROL														
	13	0256	0301	NO FLARE PATROL														
15 CULG	13	0302E	0313U	0343D	N25	E08	.394	15025	13.7	41D	-F		P	0313	50	.6	F	Y5
	13	0325	0330	NO FLARE PATROL														
	13	0335	0341	NO FLARE PATROL														
	13	0347	0501	NO FLARE PATROL														
	13	0523	0545	NO FLARE PATROL														
	13	0548	0557	NO FLARE PATROL														
16 CATA	13	1030	1035	1055	N23	E05	.350	15025	13.8	25	-N	2		1035	168	1.8		Y5
17 HCHA	13	1456	1458	1501	N36	E68	.942	15028	18.7	5	-F		C	1458	15	.5	D	Y5
	13	1600	1620	NO FLARE PATROL														
18 HCHA	13	1620E		1637	N36	E67	.938	15028	18.7	17D	-N		P	1622	50	1.3	E	Y5
	13	1724	1734	NO FLARE PATROL														
	13	1954	2000	NO FLARE PATROL														
19 CULG	13	2106	2112	2117D	N23	W03	.344	15025	13.7	11D	-F		P	2112	70	.8		Y5
	14	0308	0615	NO FLARE PATROL														
	14	0631	0639	NO FLARE PATROL														
	14	0755	0757	NO FLARE PATROL														
GRP65020	14	0806+7	0814+1	0817	S20	E88	1.000	15035	20.9	11	-F						D	
KANZ	14	0806	0815	0818	S20	E87	1.000	15035	20.9	12	-F							
MONT	14	0813	0814	0816	S20	E90	1.000	15035	21.1	3	-F		C	0814	20		D	
21 MONT	14	1012	1016	1024	S20	E88	1.000	15035	21.0	12	-F		C	1016	20		D	Y5
22 MONT	14	1204	1207	1211	S20	E87	1.000	15035	21.0	7	-F		C	1207	20		D	Y5
	14	1440	1705	NO FLARE PATROL														
GRP65023	14	2005+0	2006+0	2011	S25	W68	.948	15032	9.7	6	-F				20			
PALE	14	2005	2006	2011	S25	W68	.948	15032	9.7	6	-F	3	V		23		FDE	
PALE	14	2005	2006	2011	S25	W68	.948	15032	9.7	6	-F	3	C		23		FDE	
GRP65024	14	2116+0	2117+0	2120	S25	W69	.953	15032	9.7	4	-F				20			
PALE	14	2116	2117	2120	S25	W69	.953	15032	9.7	4	-F	3	V		22		FDE	
PALE	14	2116	2117	2120	S25	W69	.953	15032	9.7	4	-F	3	C		22		FDE	
25 CULG	14	2220	2230U	2350	S25	W73	.970	15032	9.5	90	-F		C	2230	40		FJ	Y5
26 CULG	14	2318	2321	2330	S22	E74	.972	15035	20.5	12	-N		C	2321	15			Y5

Hα SOLAR FLARES

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OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS	
	DATE	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP. DAY			CONG.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.		
	NOV									MIN.								
27 CULG	15	0419	0425	0440	S24	W80	.990	15032	9.2	21	1F		C	0425	60			Y5
28 CULG	15	0645	0718U	0747	S25	W85	.998	15032	8.9	62	-F		C	0718	15			Y5
GRP65029	15	0801	0804 0809	0818	S20	E68	.942	15035	20.4	17	-N							
HTPR	15	0801	0804	0818	S20	E68	.942	15035	20.4	17	-N		C	0804	10	.1		
HTPR	15	0801	0809	0818	S20	E68	.942	15035	20.4	17	-N		C	0804				
30 HTPR	15	0842	0847	0857	S20	E68	.942	15035	20.5	15	-F		C	0847	10	.1		Y5
GRP65031	15	0920E	0920	0930	N15	E90	1.000	15034	22.1	10	-F				50			
ZURI	15	0920E	0920	0930	N14	E90	1.000	15034	22.1	10D	-F		P	0920	40			
CATA	15	0925E	0925	0930	N16	E90	1.000	15034	22.1	5D	1F	1		0925	56			
	15	1056	1100	NO FLARE PATROL														
32 KANZ	15	1247	1250	1254	N37	E40	.767	15028	18.5	7	-F						D	Y5
33 CATA	15	1255	1255	1300D	N24	E49	.785	15031	19.2	5D	-N	2		1255	56	.9		Y5
	15	1533	1744	NO FLARE PATROL														
	15	1754	1800	NO FLARE PATROL														
	15	1935	2008	NO FLARE PATROL														
34 CULG	15	2013	2026	2037	N40	E30	.719	15028	18.1	24	-N		C	2026	120	1.8		Y5
35 CULG	15	2056	2102	2112	N40	E30	.719	15028	18.1	16	-F		C	2102	30	.4		Y5
	15	2112	2116	NO FLARE PATROL														
36 VORO	15	2312	2317	2344	S22	W42	.743	15026	12.8	32	-B		C	2317	54	.8	DJ	Y5
37 CULG	16	0013	0029U	0109	N30	E33	.662	15028	18.5	56	-F		C	0029	50	.7		Y5
38 CULG	16	0705	0706	0714	N19	W48	.762	15025	12.7	9	-N		C	0706	30	.5		Y5
GRP65039	16	0739	0753	0802	S24	W45	.780	15025	12.9	23	-N				50	.8	FK	
CULG	16	0739	0753U	0803D	S23	W45	.775	15025	12.9	24D	-N		P	0753	70	1.0	FK	
HTPR	16	0748E		0800	S25	W46	.793	15025	12.9	12D	-N		C	0758	30	.3		
40 CATA	16	1115E	1120	1120D	S24	W90	1.000	15032	9.7	5D	1N	2		1120	56			Y5
	16	1232	1245	NO FLARE PATROL														
	16	1250	1402	NO FLARE PATROL														
	16	1439	1455	NO FLARE PATROL														
	16	1502	1741	NO FLARE PATROL														
	16	1749	1830	NO FLARE PATROL														
GRP65041	16	1856	1858	1920D	S23	W49	.811	15026	13.1	24	-F							
PALE	16	1856	1858	1920	S24	W51	.832	15026	13.0	24	-F	3	C		28		FOE	
MCMA	16	1907E		1951D	S23	W48	.803	15026	13.2	44D	-N		P	1908	60	1.1	E	
	16	2035	2138	NO FLARE PATROL														
	16	2140	0107	NO FLARE PATROL														
	17	0200	0235	NO FLARE PATROL														
	17	0930	0940	NO FLARE PATROL														
GRP65042	17	1100+3	1106 1115	1145D	N22	E24	.505	15031	19.3	45	-N							
CATA	17	1100	1115	1145D	N22	E24	.505	15031	19.3	45D	-B	1		1115	112	1.3	T	
KANZ	17	1103	1106	1110	N22	E25	.516	15031	19.3	7	-F							
GRP65043	17	1215+0	1215+0	1230	N22	E23	.493	15031	19.2	15	-N				100	1.1		
CATA	17	1215	1215	1235	N22	E23	.493	15031	19.2	20	-B	2		1215	112	1.3	T	
RAMY	17	1215E	1215U	1225	N23	E23	.503	15031	19.2	10D	-N	3	C		95			
	17	1545	1609	NO FLARE PATROL														
44 MCMA	17	1640	1644	1658	S23	W62	.910	15026	13.0	18	-F		C	1644	30	.8	D	Y5
	17	1714	1730	NO FLARE PATROL														
	17	1733	1753	NO FLARE PATROL														
	17	1758	1826	NO FLARE PATROL														
	17	1856	1916	NO FLARE PATROL														
	17	1922	1937	NO FLARE PATROL														
	17	1952	2026	NO FLARE PATROL														

Hα SOLAR FLARES

NOVEMBER 1977

OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IMPOR-TANCE	OBS.		MEASUREMENTS			REMARKS
	DATE NOV.	START	MAX. PHASE	END	APPROX LAT.	APPROX HER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP. DAY	MIN.		COND.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.	
	17	2200	2205	NO FLARE PATROL													
	17	2317	2341	NO FLARE PATROL													
	17	2351	2358	NO FLARE PATROL													
	18	0002	0006	NO FLARE PATROL													
	18	0012	0053	NO FLARE PATROL													
	18	0057	0105	NO FLARE PATROL													
	18	0118	0126	NO FLARE PATROL													
	18	0145	0152	NO FLARE PATROL													
	18	0303	0313	NO FLARE PATROL													
45 CULG	18	0433	0442U	0510	N21	E13	.381	15031	19.2	37	-F		C	0442	40	.4	Y5
46 KANZ	18	0826	0829	0845	N24	E12	.413	15031	19.3	19	-F						Y5
GRP65047	18	1154+3	1200+1	1207	N37	W01	.566	15028	18.4	13	-F						E
KANZ	18	1154	1201	1206	N37	W01	.566	15028	18.4	12	-F						
HONT	18	1157	1200	1208	N38	W02	.581	15028	18.3	11	-F		C	1200	40		E
	18	1427	1432	NO FLARE PATROL													
	18	1540	1726	NO FLARE PATROL													
48 HUAN	18	1726F		1732D	N20	E07	.322	15031	19.3	6D	-F	1	P	1728	20	.2	D Y5
	18	1750	1827	NO FLARE PATROL													
	18	1841	1956	NO FLARE PATROL													
	18	2227	2241	NO FLARE PATROL													
	19	0130	0142	NO FLARE PATROL													
49 CULG	19	0146E	0155U	0223	N38	W10	.598	15028	18.3	37D	-F		C	0155	100	1.3	L Y5
	19	0154	0200	NO FLARE PATROL													
50 KANZ	19	0857		1044	N22	W02	.337	15031	19.2	107	-F						Y5
51 KANZ	19	1036	1036	1055	N26	W01	.401	15031	19.4	19	-F						Y5
GRP65052	19	1245+3	1250+2	1257	S25	W19	.545	15030	18.1	12	-F						EG
HTPR	19	1245	1250	1258	S26	W18	.549	15030	18.2	13	-F		C	1250	10	.1	G
KANZ	19	1248	1252	1256	S25	W21	.561	15030	18.0	8	-F						GE
53 KANZ	19	1424		1424D	N26	W02	.402	15031	19.5		-F						D Y5
	19	1627	1634	NO FLARE PATROL													
	19	1952	2033	NO FLARE PATROL													
	19	2117	2225	NO FLARE PATROL													
	20	0100	0101	NO FLARE PATROL													
	20	0107	0119	NO FLARE PATROL													
54 KANZ	20	0852	0858	0906	N22	W12	.389	15031	19.5	14	-F						D Y5
55 KANZ	20	1104	1107	1118	N24	W90	1.000	15025	13.7	14	-F						G Y5
GRP65056	20	1132+3	1135+4	1143	N26	W14	.458	15031	19.4	11	-F						E
HTPR	20	1132	1135	1142	N21	W13	.384	15031	19.5	10	-N		C	1135	60	.6	E
KANZ	20	1135	1139	1143	N26	W14	.458	15031	19.4	8	-F						
KHAR	20	1135E	1135	1140D	N27	W14	.471	15031	19.4	5D	-F		P				
GRP65057	20	1213+2	1213	1229	N40	W23	.683	15028	18.8	16	-F						
KANZ	20	1213	1213	1228	N40	W24	.689	15028	18.7	15	-F						
WEND	20	1215		1229	N40	W23	.683	15028	18.8	14	-N						
GRP65058	20	1235+4		1248	N22	W15	.415	15031	19.4	13	-F						
WEND	20	1235		1249	N22	W16	.424	15031	19.3	14	-N						
KANZ	20	1239		1247	N22	W15	.415	15031	19.4	8	-F						
GRP65059	20	1308>9	1318	1334	N24	W12	.417	15031	19.6	26	-F						
KANZ	20	1308	1318	1332	N25	W15	.453	15031	19.4	24	-F						
WEND	20	1328		1335	N23	W10	.389	15031	19.8	7	-N						
60 KANZ	20	1416	1419	1426D	N26	W16	.474	15031	19.4	10D	-N						Y5
	20	1449	1703	NO FLARE PATROL													
	20	2120	2129	NO FLARE PATROL													
	20	2143	2151	NO FLARE PATROL													
	20	2152	2158	NO FLARE PATROL													
	20	2210	2215	NO FLARE PATROL													
	20	2220	2225	NO FLARE PATROL													

Hα SOLAR FLARES

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OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IMPOR-TANCE	OBS.		MEASUREMENTS			REMARKS	
	DATE (NOV.)	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY	MIN.		CONC.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.		
61 CULG	21	0014	0020	0036	N25	W21	.508	15031	19.4	22	-F		C	0020	30	.3		Y5
GRP65062	21	0141	0210	0254	N22	W23	.498	15031	19.3	73	-F							
			0218															
CULG	21	0141	0210U	0300	N21	W23	.489	15031	19.3	79	-F		C	0210	60	.7		
PALE	21	0217E	0218	0247	N24	W23	.518	15031	19.4	30D	-F	3	C		48		DE	
63 KANZ	21	1048		1057	N28	W28	.604	15031	19.4	9	-F							Y5
	21	1222	1459	NO FLARE PATROL														
	21	1642	1655	NO FLARE PATROL														
	21	1701	1720	NO FLARE PATROL														
	21	2101	2106	NO FLARE PATROL														
64 CULG	21	2312	2326	2337	N21	W38	.663	15031	19.1	25	-F		C	2326	15	.2		Y5
65 CULG	22	0040	0044	0115	N26	W25	.558	15033	20.2	35	-N		C	0044	30	.3		Y5
GRP65066	22	0217	0227	0304	N25	W36	.664	15031	19.4	47	-N						JL	
CULG	22	0217	0227U	0302	N27	W36	.676	15031	19.4	45	-N		C	0227	30	.3	FL	
VORO	22	0232E		0306	N24	W36	.658	15031	19.4	34D	1N		C	0232	179	2.4	EJL	
GRP65067	22	0330+1	0334+2	0400	N25	W37	.674	15031	19.4	30	1F				190	2.6	JL	
CULG	22	0330	0336	0406	N25	W36	.664	15031	19.4	36	1F		C	0336	160	2.1		
VORO	22	0331	0334	0353	N26	W39	.701	15031	19.2	22	1N		C	0334	215	2.9	JL	
68 CULG	22	0424	0428	0505	N25	W36	.664	15031	19.5	41	-N		C	0428	60	.8	F	Y5
GRP65069	22	0945+0	1005+5	1108	N24	W40	.700	15031	19.4	83	2B				450	6.3	EI	
HTPR	22	0945	1007	1105	N23	W40	.695	15031	19.4	80	2B		C	1007	400	5.6	EI	
KANZ	22	0945	1010	1110	N24	W40	.700	15031	19.4	85	2B							
CATA	22	0950E	1005	1036D	N23	W41	.706	15031	19.3	46D	2B	2		1005	505	7.3		
LOCA	22	1015E	1015	1100D	N25	W40	.705	15031	19.4	45D	2N		P	1015	652	9.5		
70 HTPR	22	1222	1223	1232	S25	W22	.565	15035	20.9	10	-F		C	1223	20	.2		Y5
	22	1530	1950	NO FLARE PATROL														
	22	2102	2108	NO FLARE PATROL														
	23	1535	2005	NO FLARE PATROL														
71 CULG	23	2007	2013	2025	N14	W21	.407	15034	22.3	18	-F		C	2013	25	.3		Y5
	23	2111	2116	NO FLARE PATROL														
	24	0318	0323	NO FLARE PATROL														
	24	0537	0542	NO FLARE PATROL														
	24	0544	0604	NO FLARE PATROL														
	24	0619	0626	NO FLARE PATROL														
GRP65072	24	0907+2	0909	0920D	N24	W64	.911	15031	19.6	13	-F						D	
HONT	24	0907	0909	0920	N24	W53	.904	15031	19.7	13	-F		C	0909	20		D	
KANZ	24	0909		0951	N24	W65	.917	15031	19.5	42	-F							
	24	1406	1414	NO FLARE PATROL														
	24	1419	1433	NO FLARE PATROL														
	24	1524	1727	NO FLARE PATROL														
	24	1801	2233	NO FLARE PATROL														
	25	0313	0325	NO FLARE PATROL														
	25	1914	1935	NO FLARE PATROL														
	25	1957	2005	NO FLARE PATROL														
	25	2254	2257	NO FLARE PATROL														
	26	1938	2010	NO FLARE PATROL														
73 HTPR	27	1333	1338	1346	N15	W88	.999	15034	21.0	13	-F		C	1338	20	.4		Y5
74 HTPR	27	1442	1447	1450	N26	W74	.966	15042	22.1	8	-F		C	1447	30	.7		Y5
	27	1535	1835	NO FLARE PATROL														
	27	1915	1945	NO FLARE PATROL														
	27	2204	2212	NO FLARE PATROL														
GRP65075	28	0305+0	0310+1	0331	N19	E60	.877	15044	1.6	26	-N				70	1.5	D	
VORO	28	0305	0310	0321	N19	E60	.877	15044	2.6	16	-B		C	0310	90	1.9	D	
CULG	28	0305	0311	0340	N19	E60	.877	15044	2.6	35	-F		C	0311	50	1.0		
76 CULG	28	0428	0431	0441	N26	W81	.989	15042	22.1	13	-F		C	0431	35			Y5
77 HONT	28	0925E	0930	0930D	N15	W90	1.000	15034	21.6	5D	-F		C	0930	20		D	Y5

Hα SOLAR FLARES

NOVEMBER 1977

OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IMPOR-TANCE	OBS.		MEASUREMENTS			REMARKS
	DATE NOV	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP. DAY	MIN.		CONF.	TYPE	TIME UT	MEAS. AREA Millionths of Disk	CORR. AREA Sq. Deg.	
	28	0930	0940	NO FLARE PATROL													
	28	2155	2208	NO FLARE PATROL													
	28	2307	0005	NO FLARE PATROL													
	29	0230	0310	NO FLARE PATROL													
	29	0758	0813	NO FLARE PATROL													
	29	1450	1532	NO FLARE PATROL													
	29	1540	1651	NO FLARE PATROL													
	29	2021	2220	NO FLARE PATROL													
	29	2225	2240	NO FLARE PATROL													
78 MITK	30	0809	0010	0026	N19	E36	.637	15044	2.7	17	-N		C	0010	60	.8	E Y5
79 CULG	30	0337	0407	0409D	S25	E90	1.000	15049	6.9	32D	?N		P	0407	45		Y5
	IMP.1 NO. MITK1																
80 KHAR	30	0905E		0908D	S28	E85	.998	15049	6.8	3D	?N		V				Y5
	IMP.1 NO. HTPR2																
	30	1530	1555	NO FLARE PATROL													
	30	2136	2141	NO FLARE PATROL													
81 CULG	30	2310	2312	0011	S21	E65	.922	15049	5.8	61	-N		C	2312	30		Y5

"Remarks":

A = Eruptive prominence whose base is less than 90° from central meridian.
B = Probably the end of a more important flare.
C = Invisible 10 minutes before.
D = Brilliant point.
E = Two or more brilliant points.
F = Several eruptive centers.
G = No visible spots in the neighborhood.
H = Flare accompanied by a high speed dark filament.
I = Active region very extended.
J = Distinct variations of plage intensity before or after the flare.
K = Several intensity maxima.
L = Existing filaments show signs of sudden activity.
M = White-light flare.
N = Continuous spectrum shows effects of polarization.
O = Observations have been made in the calcium II lines H and K.
P = Flare shows helium D_3 in emission.
Q = Flare shows the Balmer continuum in emission.
R = Marked asymmetry in Hα line suggests ejection of high velocity material.
S = Brightness follows disappearance of filament (same position).
T = Region active all day.
U = Two bright branches, parallel (||) or converging (Y).
V = Occurrence of an explosive phase: important and abrupt expansion in about a minute with or without important intensity increase.
W = Great increase in area after time of maximum intensity.
X = Unusually wide Hα line.
Y = System of loop-type prominences.
Z = Major sunspot umbra covered by flare.

NOVEMBER 1977

DAILY FLARE INDICES
Includes all Flares

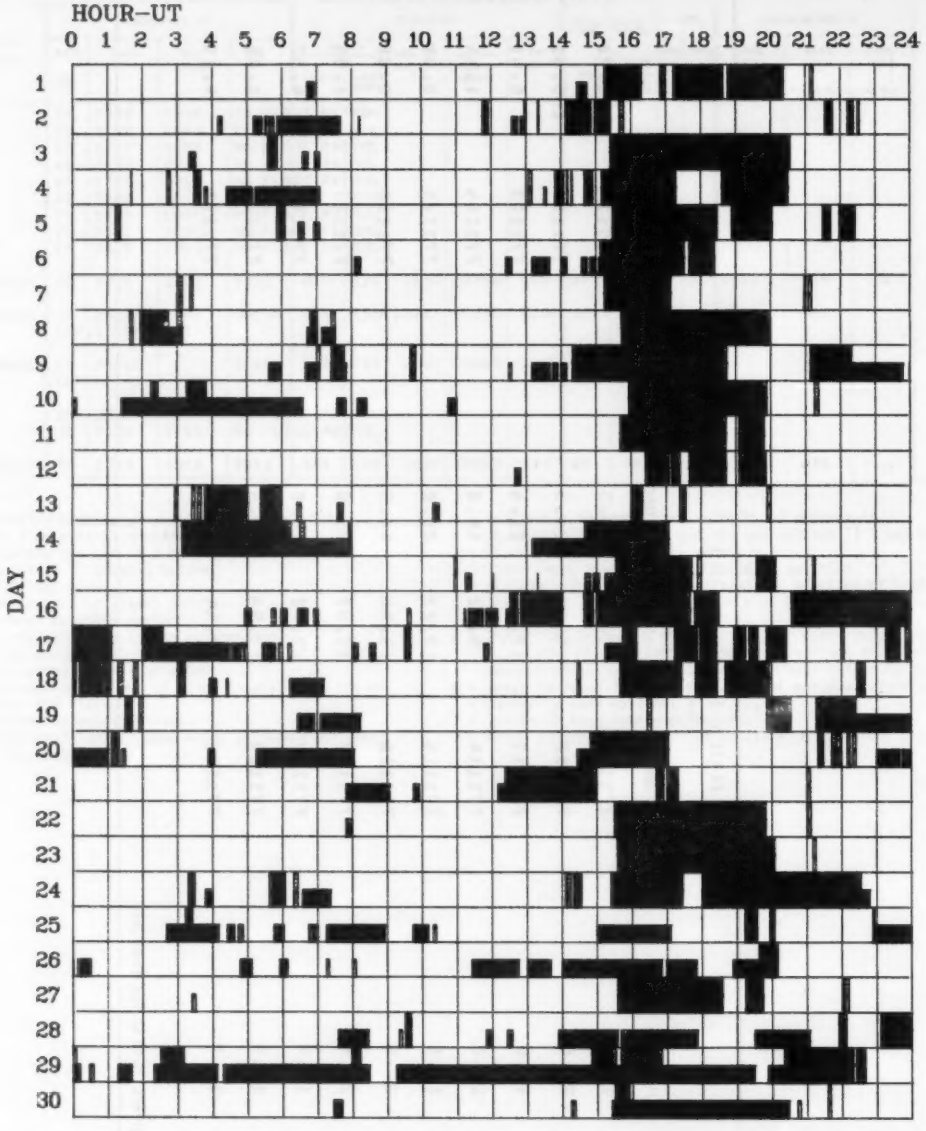
Date	Flare Index	HR. OBS.	Date	Flare Index	HR. OBS.	Date	Flare Index	HR. OBS.
771101	3.68	19.8	771111	44.04	20.3	771121	13.28	20.8
771102	12.74	22.0	771112	9.62	21.3	771122	155.61	19.6
771103	7.55	18.6	771113	17.93	21.4	771123	6.40	19.4
771104	12.41	19.0	771114	5.92	18.3	771124	1.14	16.3
771105	14.54	18.8	771115	18.28	21.0	771125	0.00	23.3
771106	.93	20.9	771116	16.56	14.5	771126	0.00	23.5
771107	12.24	21.8	771117	10.07	20.0	771127	1.94	20.4
771108	28.57	18.4	771118	20.82	18.8	771128	4.37	22.7
771109	9.78	17.8	771119	22.59	21.8	771129	0.00	19.0
771110	6.51	19.2	771120	27.64	21.0	771130	4.25	23.5

When no Flare Index is given, it is 0 for that day.

INTERVALS OF NO FLARE PATROL OBSERVATION

FOR PRECEDING SOLAR FLARE TABLE

NOVEMBER 1977



Observatories included in total patrol:

Athenes	Herstmonceux	Kodaikanal	Mitaka	Tehran
Bucharest	Huancayo	Locarno	Monte Mario	Upice
Catania	Istanboul	Lvov	Palehua	Voroshilov
Culgoora	Kanzelhohe	Manila	Ramey	Wendelstein
Haute Provence	Kiev	McMath-Hulbert	Tashkent	Zürich

Times of no flare patrol are shown by the shaded area for each day divided into times of no cinematographic patrol (bottom half of day) and times of neither visual nor cinematographic patrol (top half of day).

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

NOVEMBER 1977

NOV 1977	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} MEAN	INT	POLARIZATION OR REMARKS
1	260	ONDR	44 NS	0720 E		390 D	67			
	245	SGMR	44 NS	1121 E	1848.6	611 D	86.7			
	237	TRST	41 F	0736.1	0736.3	.3	245			L
	202	IZMI	3 S	0736	0736.4	.5	150	100		
	3100	CRIM	8 S	0750.5	0751	1	3	1		
	208	VORO	44 NS	2300		240		8		
2	3750	TYKW	5 S	0031.5	0032.3	3	1	.3		
	2000	TYKW	5 S	0032	0032.3	1	.7	.2		0L
	1000	TYKW	45 C	0032	0032.2	1	21	2		10L
	260	ONDR	44 NS	0754 E		391 D	24			
	202	IZMI	44 NS	0812		108	25			
	245	SGMR	44 NS	1123 E	1437.6	608 D	43.5			
3	208	VORO	43 NS	0122	0217	86	10	7		
	260	ONDR	44 NS	0750 E		400 D	28			
	240	DWIN	44 NS	0953	1000	180 D	30	4		
	160	DWIN	44 NS	0953	1000	60 D	28	5		
	9100	ARCE	24	1117.6		8.1				
4	202	IZMI	44 NS	0600		180	26			
	260	ONDR	44 NS	0746 E		404 D	13			
	930	BORO	40 F	0832.3	0832.8	.7	18	2		
	930	BORO	40 F	1032.4	1032.5	.3	46	2		
	240	DWIN	8 S	1414.6		.1	50	5		
	237	TRST	41 F	1414.6	1414.7	.2	110			L
	930	BORO	40 F	1537.5	1537.5	.7	53	2		
5	200	HIRA	45 C	0417.3	0418	1.2	500	30		O
	3100	CRIM	20 GRF	0732	0744	1	3	1		
	260	ONDR	44 NS	0802 E		352 D	11			
	8000	ATHN	40 F	0818.6	0818.6	10.7	82.5	41.2		
	245	SGMR	6 S	2046.9	2048	2.1	44.8	13.5		
	410	SGMR	6 S	2047.4	2048.2	2.2	42.8	12.7		
	606	SGMR	3 S	2047.4	2047.7	.8	55.6	16.7		
	1415	SGMR	1 S	2047.5	2047.7	.6	7.2	2.2		
6	250	GORK	1 S	1050.4	1052.2	2.1	4.5	2		
	2800	OTTA	20 GRF	1920	1932	65	3.2	1.6		
	245	SGMR	6 S	1921	1922.8	2.4	14.3	7.1		
7	208	GORK	41 F	0533	0548	44	98			
	200	GORK		0533	0558		54			
	200	GORK		0533	0609.8		27			
	200	HIRA	24 R	0535	0547.5	110 D	80	15		WR
	500	HIRA	27 RF	0535	0548	73	30	3		WR
	650	GORK	22 GRF	0538.6	0547.5	75	15	5		
	100	HIRA	24 R	0540	0558	100 D	350	50		O
	606	MANI	22	0544.8	0547.2	12.4	9.9	7.3		NT
	1415	MANI	2	0545.5	0549.4	5.5	3.7	3.1		
	2000	TYKW	45 C	0546	0547.7	7	13	3		8L
	1000	TYKW	45 C	0546	0550.1	7	6	2		15L
	108	GORK	2 S/F	0557.1	0557.8	1.6	480			
	113	POTS	45 C	0620	0656	305	70	23		
	234	POTS	45 C	0620	0701	320	16	10		
	100	GORK	43 NS	0542		318		10		
	200	GORK	43 NS	0615		165		5		
	127	TORN	44 NS	0650 E	0800 U	260 U	50 U			V=0
	228	HARS	47 GB	0750 E	0758 U	20 D	70 U	17 U		
8	8800	ATHN	3 S	0840.9	0840.9	.3	44.6	13.4		
	408	TRST	42 SER	1059.2	1100.1	3.8	19			
	237	TRST	41 F	1100	1100.1	.3	1500			L
	268	ONDR	8 S	1100	1100	.3	185			
	536	ONDR	4 S/F	1215.7	1216.3	1.5	26	3.7		
	268	ONDR	8 S	1215.8	1215.8	.5	54			
	237	TRST	41 F	1215.9	1216.1	.3	215			L
	930	BORO	40 F	1322.4	1322.6	.2	42	2		
	4995	BCUL	8 S	1839	1839.5	2.5	13	4		
9	3100	CRIM	24 R	0938	1200 U		3			
	268	ONDR	8 S	1021	1021	.2	22			
	268	ONDR	8 S	1028.3	1028.3	.2	25			
	536	ONDR	3 S	1038.8	1038.8	.2	13			
	536	ONDR	3 S	1056.2	1056.2	.2	17			
	268	ONDR	3 S	1131.8	1131.8	.2	16			
	18	MCMA	41 F	1659	1702	8			1	
11	260	ONDR	2 S/F	0911	0911.8	1.2	8	2.8		
	536	ONDR	3 S	0912	0912	.3	11			
	808	ONDR	3 S	0912	0912	.3	28			
	536	ONDR	3 S	1222.3	1222.3	.2	20			
	113	POTS	F	1233.7	1236.7	8.5	150	18		
	9500	9ERL	2	1311	1311.1	1	30			

SOLAR RADIO EMISSION
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NOV 1977	FREQUENCY	STATION	TYPE		STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	POLARIZATION OR REMARKS
	2800	OTTA	20	GRF	1420	1450	90	2.8	1.5		
12	1420	BCUL	8	S	1707.5	1708.5	1	4	1		
	4995	BCUL	3	S	1827	1828	1.5	12	4		
	2695	BOUL	1	S	1828	1829	1.5	3	1		
13	260	ONDR	44	NS	0800		350 D	22			
	4995	BCUL	1	S	1606.5	1608	3	7	2		
	2695	SGMR	3	S	1607.5	1608.5	2.5	12.2	3.7		
	2800	OTTA	1	S	1607.5	1608.5	6	9.6	2.2		
	4995	SGMR	1	S	1607.6	1608.5	2.4	5.5	1.7		
	1415	SGMR	3	S	1607.6	1608.7	1.7	12.4	3.7		
	245	SGMR	6	S	1607.7	1608.2	1.3	15.8	4.7		
	410	SGMR	6	S	1607.8	1608.6	1.6	2	.6		
	2695	BCUL	3	S	1608.5	1610	4	9	3		
14	260	ONDR	44	NS	0753 E		358 D	12			
	930	BORC	8	S	0807.8	0807.8	.2	35	2		
	1420	ARCE	1		1044.9	1045	.4				
	1420	ARCE	29		1045.3		26.6				
	930	BORD	40	F	1047.8	1047.9	.2	21	2		
	245	SGMR	43	NS	1923.4	2034.3	113.6D	19.3			
	208	VORC	44	NS	2300		240		7		
	580	HIRA	45	C	2319.1	2319.4	1	18	7		WR
15	260	ONDR	44	NS	0753 E		359 D	17			
	245	SGMR	44	NS	1139 E	1259.5	577 D	19.2			
	930	BORD	40	F	1246.3	1246.8	.6	24	2		
	2800	OTTA	1	S	1424	1427	10	1	.5		
	2800	OTTA	1	S	1755	1800	10	1	.5		
	2800	OTTA	20	GRF	1815		15	.8	.5		
	1420	BCUL	8	S	2021	2021.5	1	4	1		
	1420	BCUL	8	S	2024	2024.5	1.5	5	2		
	208	VORO	44	NS	2300		240		8		
16	260	ONDR	44	NS	0814 E		326 D	10			
	248	DWIN	44	NS	0900 E		274 D		2		
	160	DWIN	44	NS	0900 E		274 D		2		
	930	BORD	41	F	1040.3	1040.4	.6	31	2		
	202	IZMI	3	S	1128.7	1128.7	.3	220	120		
	245	SGMR	43	NS	1615	1822	300 D	19			3
	2800	OTTA	20	GRF	1848	1910	80	1.6	.8		
17	208	VORO	43	NS	0234		26		7		
	200	GORK	44	NS	0539		459		10		
	100	GORK	43	NS	0605		355		5		
	127	TORN	44	NS	0650 E	0835.6	440 D	65			V=2
	260	ONDR	44	NS	0847 E		256 D	22			
	240	DWIN	44	NS	0900 E		168 D		5		
	160	DWIN	44	NS	0900 E		168 D		10		
	245	SGMR	44	NS	1142 E	2022	572 D	197			
	410	SGMR	43	NS	1600	1839.6	314 D	68.4			
	127	TORN			0650 E	1049		80			
	200	GORK	8	S	0957	0957.5	2	27	13		
	650	GORK	3	S	0957.2	0957.5	.6	42	20		
	930	BORD	8	S	1310.4	1310.5	.1	24	2		
	200	HIRA	44	NS	2120 E	2300	610 D	40	10		SL
	208	VORO	44	NS	2300	0202	240	21	14		
18	202	IZMI	41	F	0600		25	35			
	3100	CRIM	24	R	0805	0928		5			
	260	ONDR	44	NS	0820 E		326 D	108	11		
	240	DWIN	44	NS	0846 E		181 D		3		
	160	DWIN	44	NS	0846 E		181 D		3		
	202	IZMI	43	NS	1010		110	50			
	245	SGMR	44	NS	1143 E	1538.2	571 D	16.7			
	410	SGMR	44	NS	1143 E	1207.8	571 D	19.2			
	127	TORN	40	F	1132.9	1237	40 U	6			
	1420	ARCE	40		1149.7	1151.1	2				
	536	ONDR	4	S/F	1156.3	1157.8	5	8.4	4		
	808	ONDR	45	C	1158.2	1158.7	2.6	22	7.7		
	930	BORC	40	F	1158.7	1158.9	1.7	28	4		
	1470	BERL	6		1158	1159.4	2	8.2			
	2800	OTTA	21	GRF	1635	1700	150	6.8	3.4		
	1415	SGMR	4	S/F	1644	1649.2	11.3	37.5	11.3		
	2695	SGMR	4	S/F	1646	1650.4	10.6	29.7	8.9		
	410	SGMR	6	S	1646.2	1652	8.2	71.6	21.5		
	245	SGMR	6	S	1646.2	1647.7	8.2	19.1	5.7		
	606	SGMR	4	S/F	1646.3	1651.8	9.2	115	34.4		
	4995	SGMR	3	S	1646.5	1652	10.4	17.3	5.2		
	2800	OTTA	4	S/F	1646	1650	11	26	13		
	8800	SGMR	1	S	1647.9	1652.2	7.7	9.3	2.8		
	1420	BCUL	1	S	1703	1704	2	2	1		
	208	VORO	44	NS	2300		240		7		
19	3750	TYKW	5	S	0014	0014.3	2	3	1		

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	2000	TYKW	5	S	0014	0014.3	2	1.8	.6		0L
	9400	TYKW	5	S	0523.3	0523.7	1	8	3		25L
	202	IZMI	1	S	0914.3	0914.5	.7	40	10		
	237	TRST	41	F	0914.6	0914.6	.5	104			R
	260	ONDR	2	S/F	0914	0914.5	1	12	2		
	260	ONDR	3	S	0955.7	0955.7	.2	7			
	9500	BERL	1		1151	1151.4	3	7			
	2800	OTTA	1	S	1756.2	1800	10	1.6	.8		
	2800	OTTA	20	GRF	1940	1945	15	1.6	.8		
20	3750	TYKW	5	S	0229	0230.3	5	7	2.5		15R,250001F
	3750	TYKW	30	PBI	0234		90	1.8	.9		
	2000	TYKW	5	S	0230	0230.1	1	9	2		10L
	3750	TYKW	20	GRF	0310	0324	40	3	1		0R,250001F
	500	HIRA	45	C	0617.3	0617.3	2.5	25	5		SL
	100	HIRA	45	C	0617.3	0617.5	1	300	70		ML
	200	HIRA	45	C	0617.3	0617.3	2	400	15		0
	200	GORK	6	S	0617.6	0618.2	2.2	36			
	237	TRST	41	F	1326.9	1327	.3	58			
	260	ONDR	8	S	1327.2	1327.2	.2	17			
	245	SGMR	43	NS	1513.6	1922.3	358.40	20			
	410	SGMR	43	NS	1522.8	1923	349.20	23.8			
	2800	OTTA	20	GRF	1555	1710	310	4	2		
	245	SGMR	6	S	1602.9	1643.6	68.1	28	14		
21	500	HIRA	27	RF	0058	0123.7	85	7	3		0
	200	HIRA	27	RF	0100	0220	240	20	5		0
	3750	TYKW	20	GRF	0140	0215	120	2	1		250021F
	288	VORO	27	RF	0230	0230	124	21	13		
	260	ONDR	45	C	1035	1085.2	2	27	11.8		
	237	TRST	41	F	1051.5	1051.7	.5	34			
	260	ONDR	8	S	1051.7	1051.7	.3	44			
	1420	ARCE	1		1236.6	1236.7	.5				
22	3750	TYKW	5	S	0039	0041.3	5	22	7		251038F
	3750	TYKW	29	PBI	0044		20	3	1		
	4995	MANI	3		0040.2	0041.5	3	26.7	8		
	2000	TYKW	5	S	0040.5	0041.3	2.5	3	1		15L
	2695	MANI	3		0040.4	0041.5	4.1	10.4	2.3		
	3750	TYKW	21	GRF	0210	0226	110	6	2		251038F
	3750	TYKW	5	S	0215	0216.4	7	3.5	1.2		251038F
	3750	TYKW	5	S	0252	0255	15	1.2	.5		
	3750	TYKW	45	C	0331	0333.2	20	2	1		251038F
	3750	TYKW	21	GRF	0410	0440	70	3	1.5		
	3750	TYKW	45	C	0424	0425.8	16	17	4		251038F
	2695	MANI	1		0424.6	0426.3	4.4	9.2	.9		
	4995	MANI	3		0424.9	0426.3	4.1	25.6	2.6		
	5730	IRKU		S	0424	0426	10	16	4		L
	3750	TYKW	5	S	0440	0444	20	4.5	1.7		
	2000	TYKW	5	S	0425	0426.2	4	3.5	1.5		15L
	2000	TYKW	29	PBI	0429		11	1.2	.6		
	3750	TYKW	5	S	0530	0534	20	1.5	.5		
	260	ONDR	44	NS	0820	E	327	D	9		
	100	GORK	43	NS	1033		90		20		
	950	GORK	28	PRE	0933		19.5				
	950	GORK	49	GB	0958.5	1033.3	64.5	780			
	950	GORK			0958.5	1035.5	42	2183			
	950	GORK			0958.5	1055.3		774			
	950	GORK	30	PBI	0958.5	1103	42	50			
	650	GORK	1	S	0933.6	0939	22.2	4	2		
	1420	ARCE	28		0944.8		13.8				DUBIOUS TIME
	1470	BERL	46		0946.5	1032.8	137	1380			
	3000	BERL	46		0946.5	1006	134	1200			
	4995	ATHN	47	GB	0948.4	1005	74.3	3468	1040		
	2695	ATHN	47	GB	0948.8	1007	74.1	1598	479		
	9100	GORK	23	GRF	0949.4		123				
	2950	GORK	48	C	0949.9	1007	160	1400			
	1415	ATHN	47	GB	0955.4	1002.8	67.5	441	114.3		
	1415	ATHN	47	GB	0955.4	1008.6		481.3			
	1415	ATHN	47	GB	0955.4	1032.7		3471			
	1415	ATHN	47	GB	0955.4	1034.2		4171			
	930	BORC	28	PRE	0957	1004	24	550			
	8800	ATHN	47	GB	0957.9	1004.2	60.8	4735	1421		
	775	BERL	45	C	0957		179				
	9100	GORK	48	C	0958	1002.1	17	3100			
	650	GORK	48	C	0958	1035.4	122	6900			
	1420	ARCE	47		0958.1	1033.6	49.5				
	1420	ARCE			0958.1	1002.2	5.3				
	9500	BERL	46		0958	1003.5	92	3300			
	408	TRST	49	GB	0959.5	1009.4	16.9	570			
	536	ONDR	49	GB	0959.6		71	436	357		
	536	ONDR			0959.6	1005.5		338			
	536	ONDR			0959.6	1055		403			
	536	ONDR			0959.6	1058.6		280			
	234	POTS	45	C	0959	1034.5	201	400			

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	888	ONDR	49	GB	0959		65	626	500		
	808	ONDR			0959	1005.8		505			
	808	ONDR			0959	1059		535			
	237	TRST	47	GB	1000.9	1034.8	155.5	1600			R
	260	ONDR	49	GB	1000		117	226	113		
	260	ONDR			1000	1054.5		141			
	260	ONDR			1000	1142		44			
	200	GORK	45	C	1000	1009	36	540			
	228	HARS	47	GB	1001	1007	90	750	136		
	127	TORN	28	PRE	1001.2		.7	.4	.3		
	127	TORN	49	GB	1001.9	1002 D	218 D	1000 D	50 U		SATURATED
	127	TORN			1001.9	1009.4		5000 U			
	127	TORN			1001.9	1013.2		4000 U			
	202	IZMI	45	S	1001.3	1004.8	16	850	660		
	108	GORK	46	C	1001.6	1003.7	30	25500			
	108	GORK			1001.6	1009.2		26000			
	113	POTS	45	C	1001	1004	185	35000			
	228	HARS		S	1002.5E	1002.5	1.5	170			
	1420	ARCE			1003.4	1006.2	17.8				
	408	TRST	49	GB	1016.4	1026.2	32	670			
	202	IZMI	48	C	1017.3	1026.3	31.2	380	220		
	228	HARS		S	1019.5E	1019.5	1.5	195			
	930	BORD	47	GB	1021	1036	29	4100			
	930	BORD			1021	1027.8		800			
	930	BORD			1021	1038.5		1350			
	930	BORD			1021	1040		1050			
	930	BORD			1021	1041		1210			
	930	BORD			1021	1042.6		1250			
	930	BORD			1021	1045		600			
	1420	ARCE			1021.2	1033.6	16.2				
	228	HARS		S	1021.5E	1021.5	2	147			
	228	HARS		C	1023 E	1023	2.5	168			
	228	HARS		C	1031.5E	1031.5	9.5	700	225		
	1420	ARCE			1037.4	1038.3	10.2				
	228	HARS		S	1037.5E	1037.5	2	55			
	228	HARS		S	1040 E	1040	4	87			
	127	TORN	45	C	1042	1044.2	6	25	15		
	1420	ARCE	30		1047.6		85				
	1420	ARCE	4		1048.4	1054.7	13.6				
	408	TRST	49	GB	1048.4	1055.7	19.2	650			
	202	IZMI	29	PBI	1048.5	1100.4	62	60	30		
	930	BORD	47	GB	1050	1056	15	845			
	930	BORD			1050	1057		790			
	930	BORD			1050	1100		695			
	930	BORD	29	PBI	1105	1118	55	13			
	228	HARS		F	1052 E	1052	9	70			
	408	TRST	49	GB	1107.6	1122.6	23.4	66			
	536	ONDR	46	C	1109.5	1133.8	51	143	24		
	536	ONDR			1109.5	1122.5		98			
	808	ONDR	46	C	1111	1134.6	48	80	18		
	808	ONDR			1111	1138		58			
	228	HARS		F	1117.5E	1117.5	7	40			
	160	OMIN	45	C	1121.5		1.2	10	3		
	408	TRST	49	GB	1131	1139.1	20	120			
	408	TRST	29	PBI	1151	1154.3	9	12			
	930	BORD	3	S	1133	1134.6	4.3	52			
	1420	ARCE			1133.2	1135	4.5				
	1420	ARCE	45		1133.2	1135	16				
	950	GORK	3	S	1133.6	1134.6	2.2	34			
	930	BORD	3	S	1137.3	1138.8	6.7	37			
	1420	ARCE			1137.7	1138.9	11.5				
	950	GORK	3	S	1137.9	1138.8	4	18			
	1420	ARCE	3		1153.8	1155.1	6				
23	260	ONDR	44	NS	0810 E		350 D	13			
	1420	ARCE	1		0922.3	0922.5	.5				
	1420	ARCE	2		0940.1	0940.2	.7				
24	930	BORD	40	F	1106	1106.4	.4	15	2		
	2695	PENT	1	S	2116	2117	4.5	1.4	.7		
25	260	ONDR	42	SER	1024	1032.2	9	138			
	9100	ARCE	1		1250.7	1259	1				
26	8800	ATHN	3	S	0642	0642.5	1.1	32.6	9.8		
	18	MCMA	6	S	1351	1353	2			1	
	930	BORD	8	S	1545.4	1545.6	.3	25	2		
27	18	MCMA	6	S	2056	2057	2			1	
28	930	BORD	40	F	1116.7	1116.8	.4	12	2		
	9100	ARCE	3		1227.6	1227.7	1.2				
	930	BORD	40	F	1456.6	1456.7	.1	53	2		
29	9100	ARCE	28		1127.3	1138.5	66				DUBIOUS TIME

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

NOVEMBER 1977

NOV 1977	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	POLARIZATION OR REMARKS
	1420	ARCE	41	1141.7	1141.8	20.5				DUBIOUS TIME
	1420	ARCE	8	1141.7	1141.8	.5				
	1420	ARCE	2	1147.6	1147.9	3				
	1420	ARCE	1	1152.2	1152.3	.5				
	1420	ARCE	2	1208.2	1208.3	2				
30	3750	TYKW	20 GRF	0330	0340	80	2	1		
	260	ONDR	3 S	0914.1	0914.1	.2	6			
	260	ONDR	1 S	0916.6	0916.6	.2	3.5			
	260	ONDR	45 C	0950	0950.7	3	10	1.8		
	260	ONDR	4 S/F	1100	1100	1.5	8	5		
	1420	ARCE	4	1130.2	1130.5	.9				
	200	HIRA	41 F	2309	2311	3	10000			HR
	100	HIRA	41 F	2309.2	2310.5	6	1200			HLWR

Reports received from the following observatories:

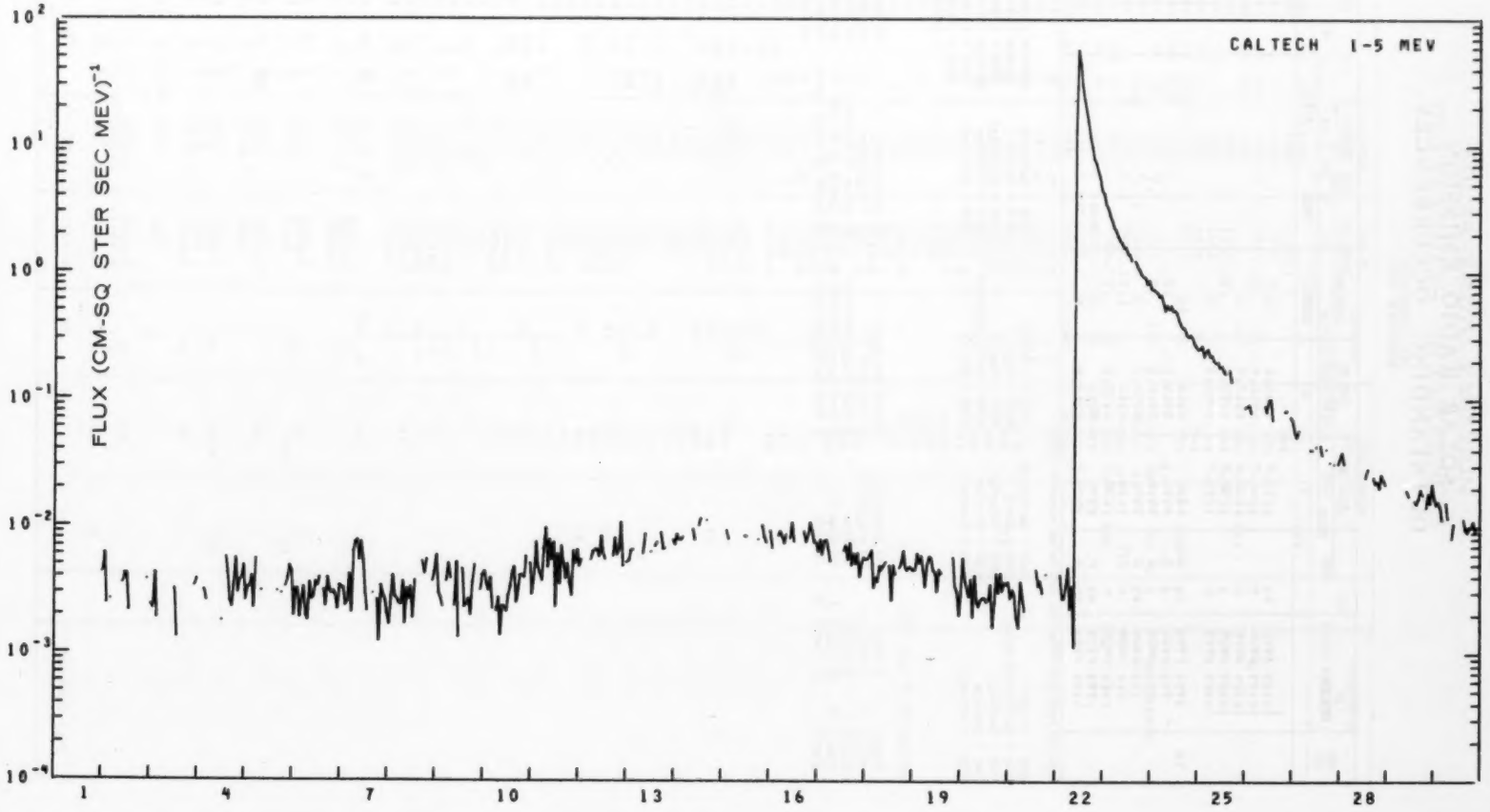
ARCE = Arcetri
BERL = Berlin-Adlershof
BORD = Bordeaux
BOUL = Boulder
CRIM = Simferopol
DWIN = Dwingeloo
GORK = Gorky
HARS = Harestua
HIRA = Hiraiso
HUAN = Huancayo
IRKU = Irkutsk
KIEV = Kiev
MANI = Manila
MCMA = McMath-Hulbert
NAGO = Nagoya
ONDR = Ondrejov
OTTA = Ottawa
PENT = Penticton
POTS = Potsdam
SAOP = Sao Paulo
SGMR = Sagamore Hill
SYDN = Sydney
TORN = Torun
TYKW = Toyokawa
TRST = Trieste
VORO = Voroshilov (Ussurisk)

Explanation of Type Code:

1 Simple 1
2 Simple 1F
3 Simple 2
4 Simple 2F
5 Simple
6 Minor
7 Minor +
8 Spike
20 Simple 3
21 Simple 3A
22 Simple 3F
23 Simple 3AF
24 Rise
25 Rise A
26 Fall
27 Rise and Fall
28 Precursor
29 Post Burst Increase
30 Post Burst Increase A
31 Post Burst Decrease
32 Absorption
40 Fluctuation
41 Group of Bursts
42 Series of Bursts
43 Onset of Noise Storm
44 Noise Storm in Progress
45 Complex
46 Complex F
47 Great Burst
48 Major
49 Major +

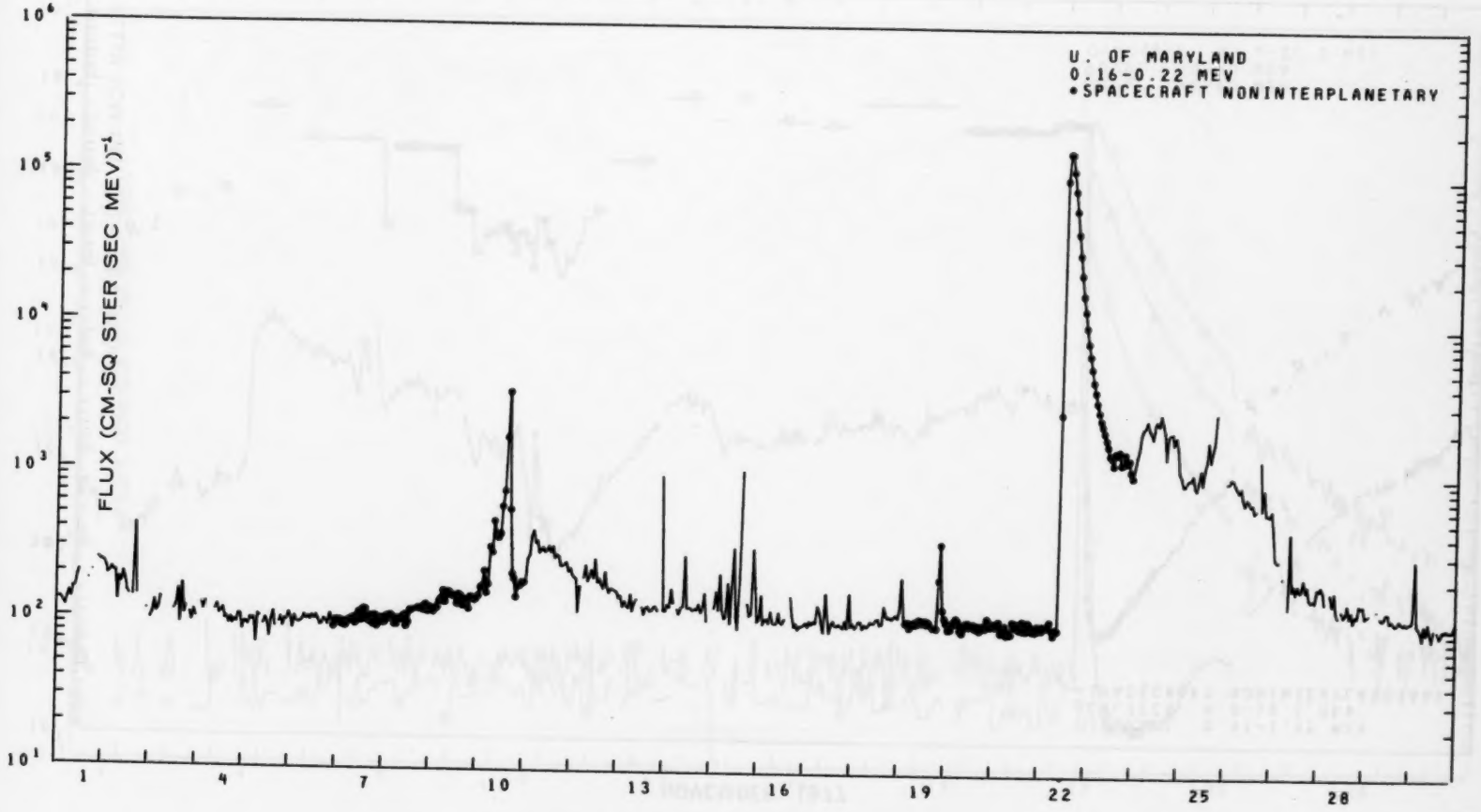
IMP 7 AND 8 ELECTRONS

NOVEMBER 1977



IMP 7 AND 8 LOW ENERGY PROTONS

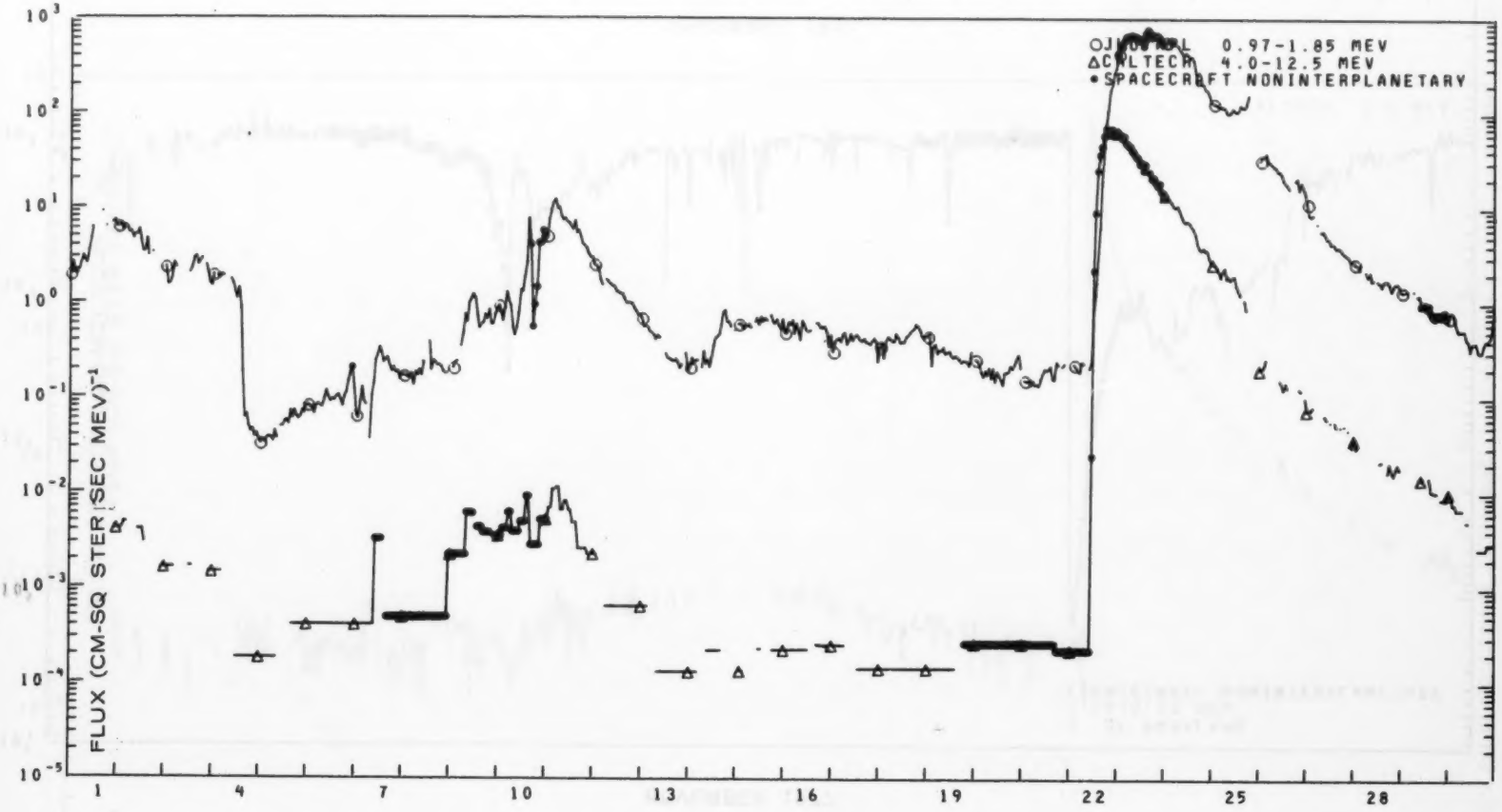
NOVEMBER 1977



23 Nov 77

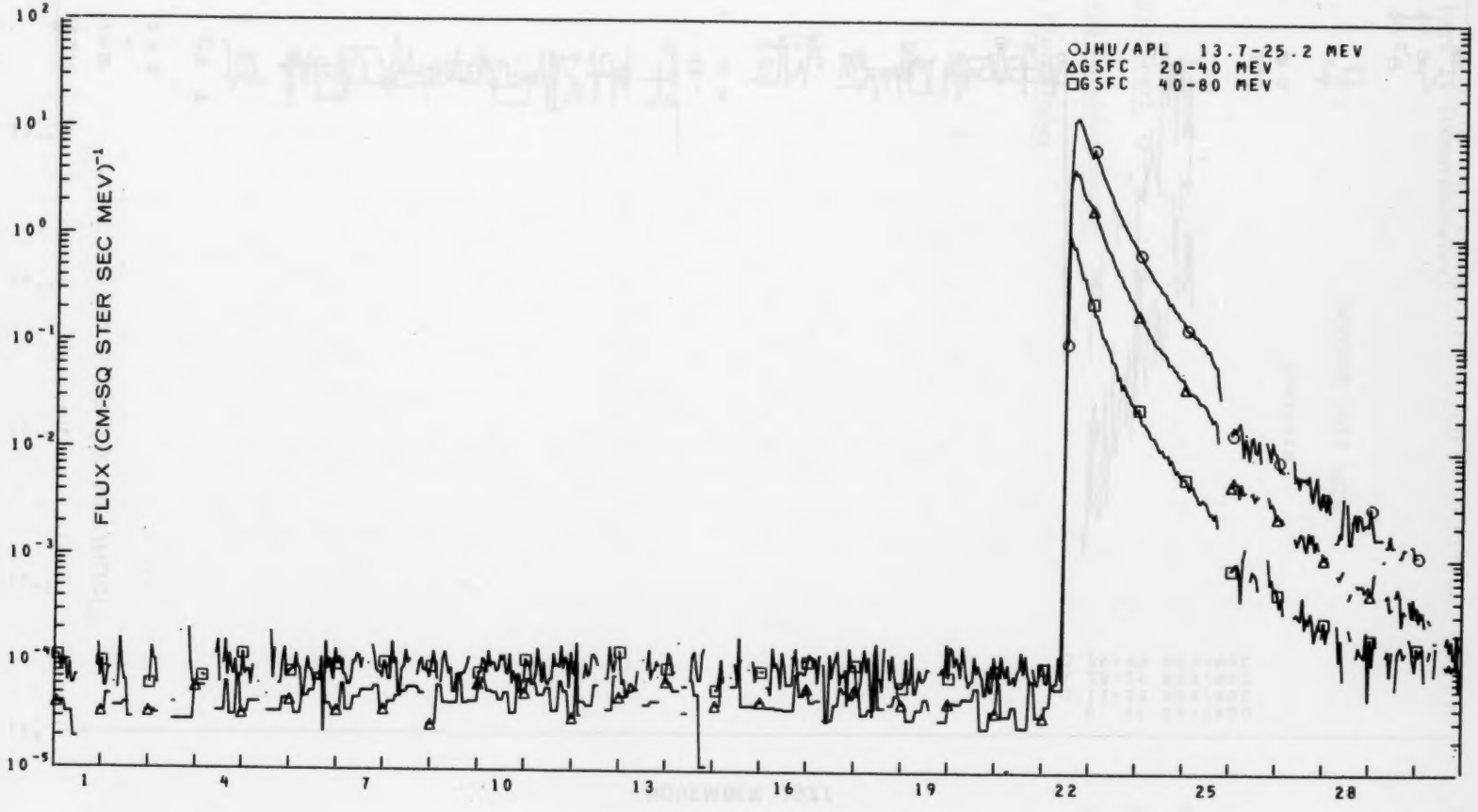
IMP 7 AND 8 INTERMEDIATE ENERGY PROTONS

NOVEMBER 1977



IMP 7 AND 8 HIGH ENERGY PROTONS

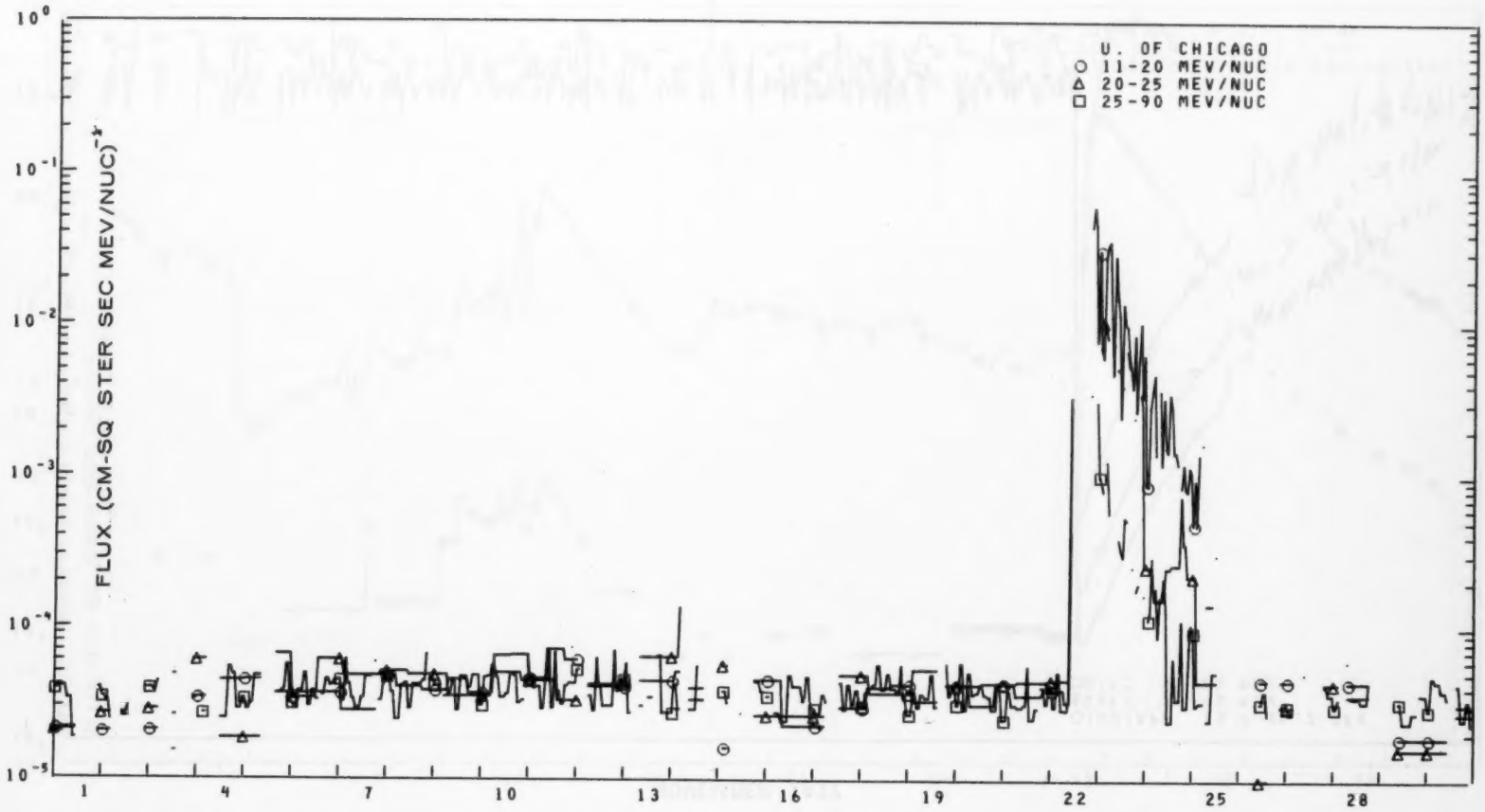
NOVEMBER 1977



25 Nov 77

IMP 7 AND 8 ALPHA PARTICLES

NOVEMBER 1977



OCTOBER 1977 DATA

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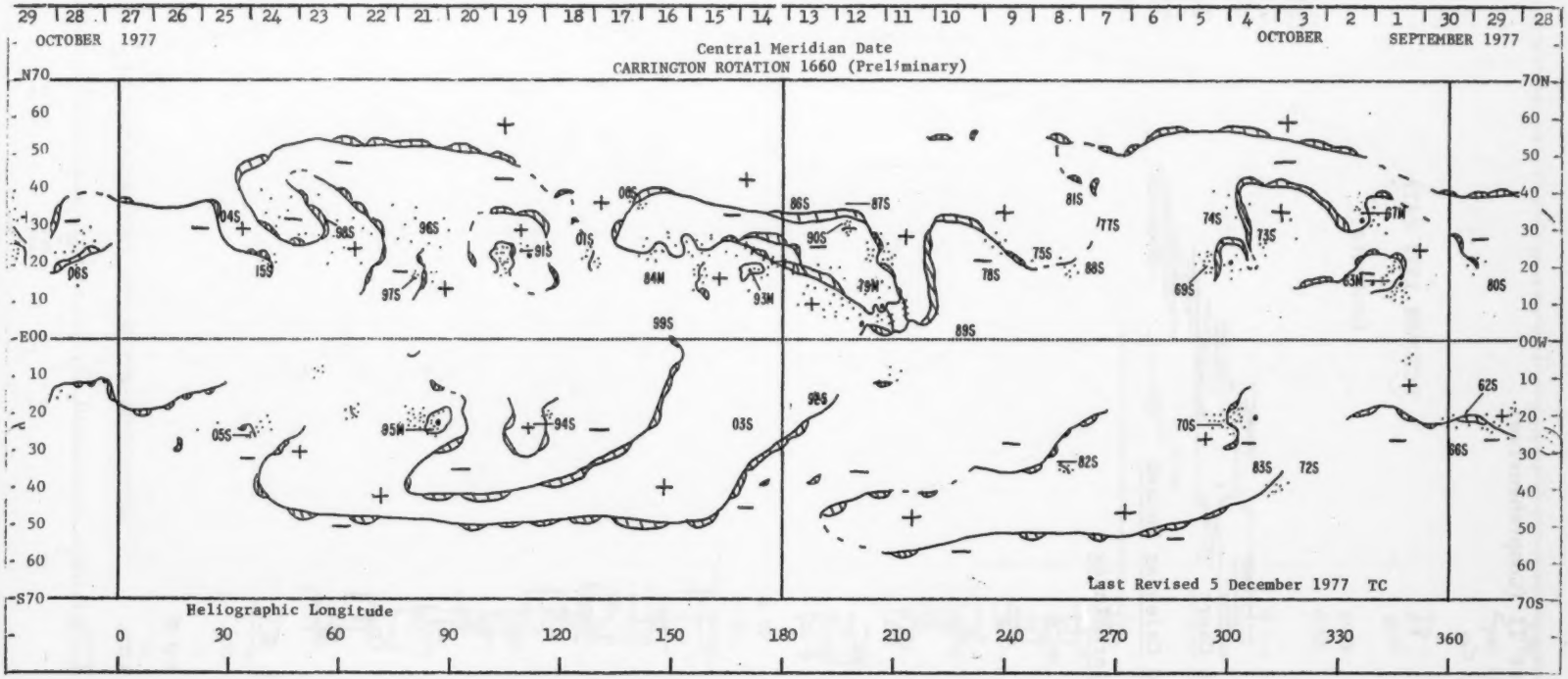
Abbreviated Calendar Record	30-37
Regional Flare Index	38

ABBREVIATED CALENDAR RECORD

Hα SYNOPTIC CHART

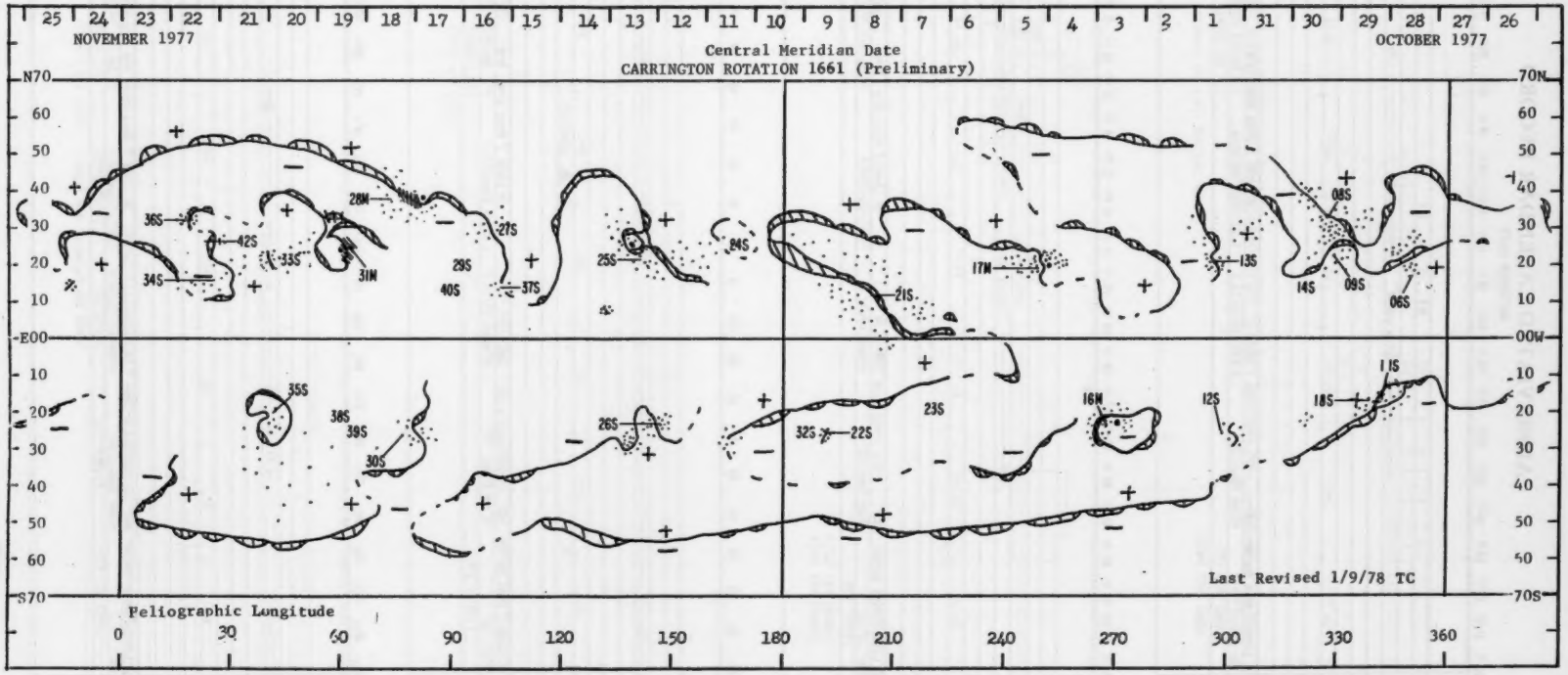
SEPTEMBER - OCTOBER 1977



ABBREVIATED CALENDAR RECORD

Hα SYNOPTIC CHART

CARRINGTON ROTATION 1661 (PRELIMINARY)

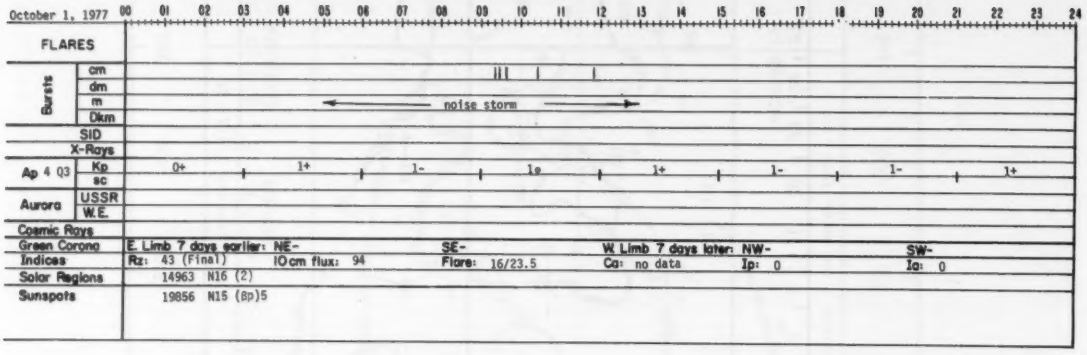


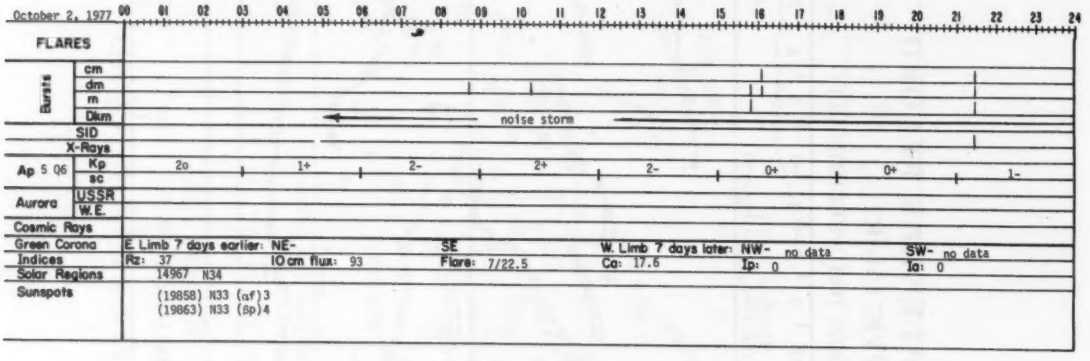
29 Oct 77

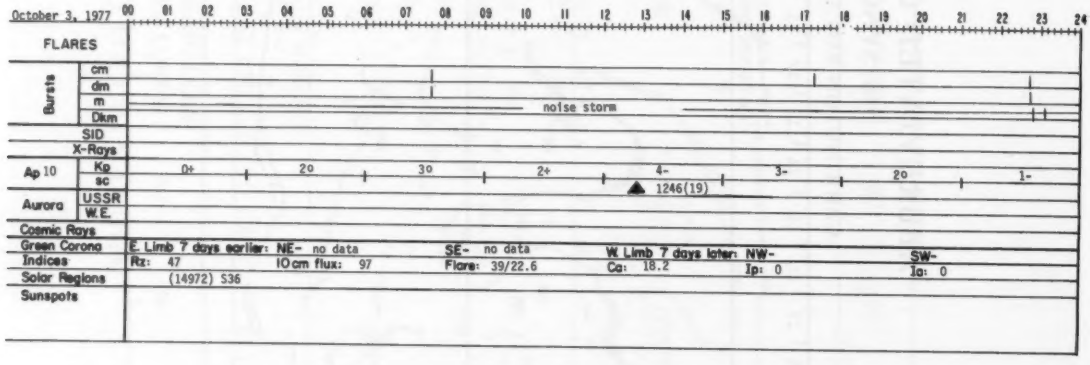
30
Oct 77

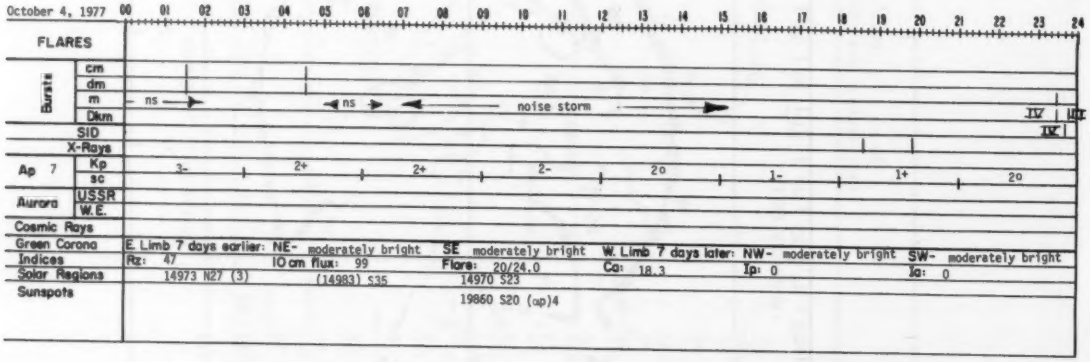
ABBREVIATED CALENDAR RECORD

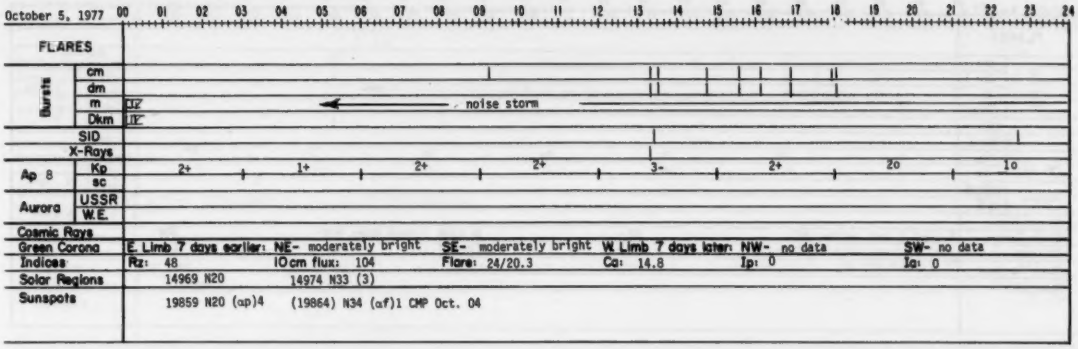
OCTOBER 1977

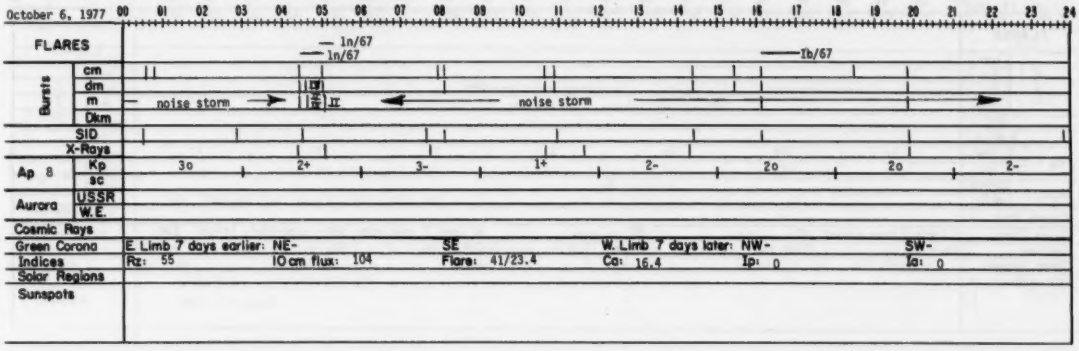


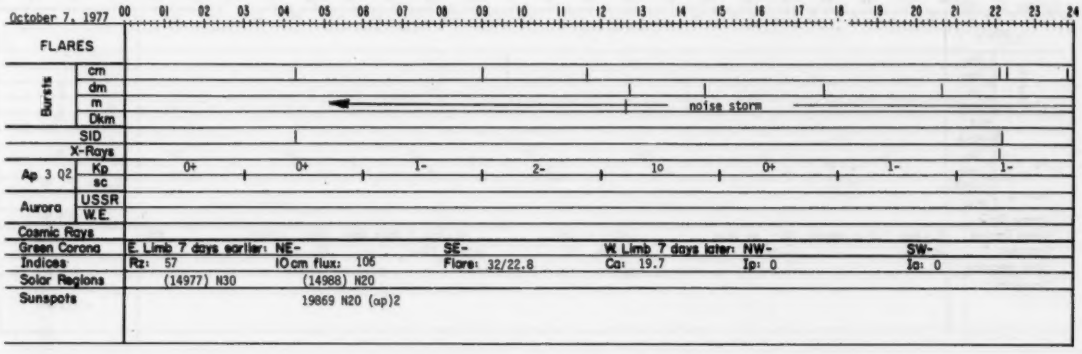


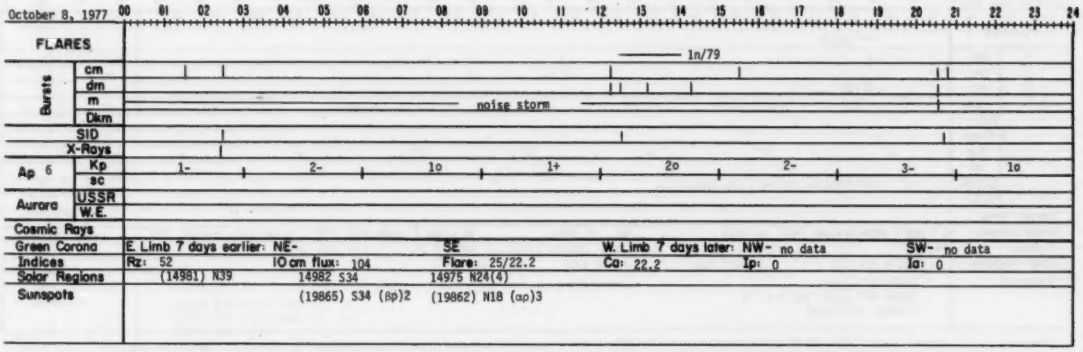


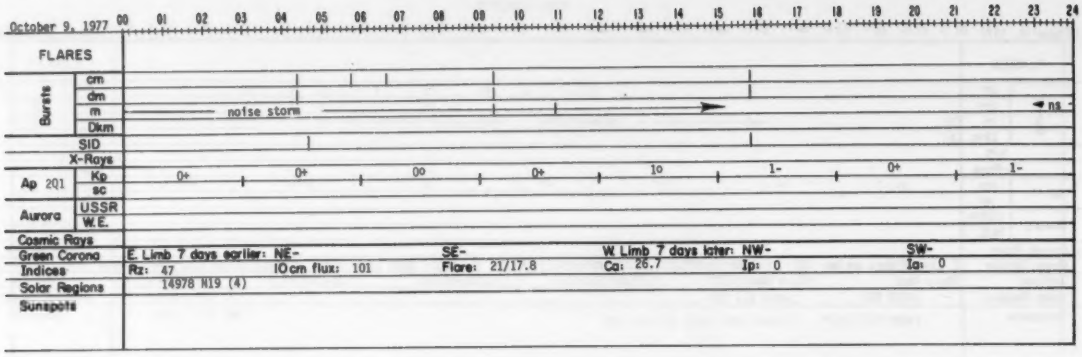


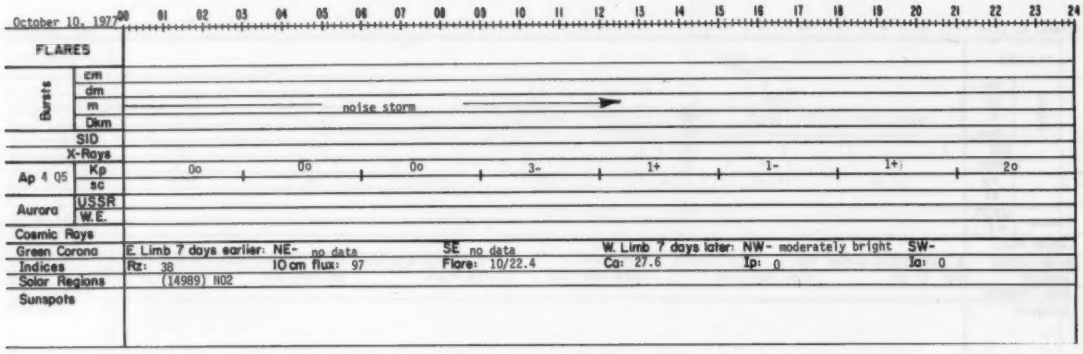

October 5, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap 8
Kp
sc
2+ 1+ 2+ 2+ 3- 2+ 2o 1o
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- moderately bright SE- moderately bright W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 48 10cm flux: 104 Flare: 24/20.3 Ca: 14.8 Ip: 0 Ia: 0
Solar Regions
14969 N20 14974 N33 (3)
Sunspots
19859 N20 (ap)4 (19864) N34 (af)1 CMP Oct. 04

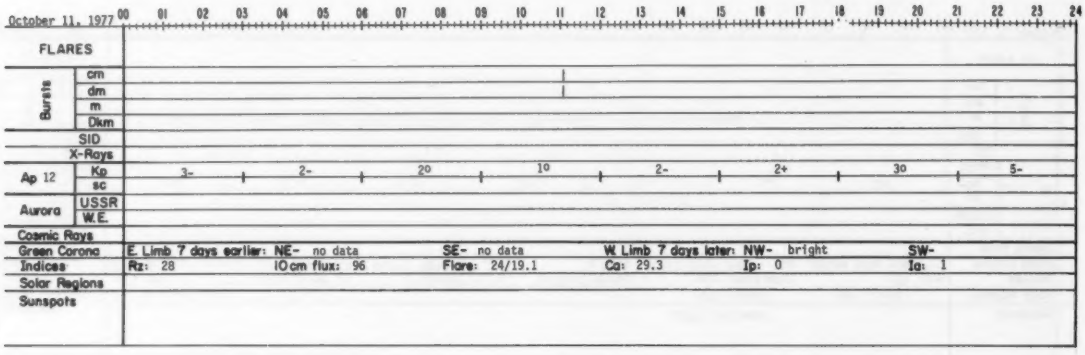

October 6, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
1n/67
1n/67
1b/67
Bursts
cm
dm
m
Dkm
noise storm
noise storm
SID
X-Rays
Ap 8
Kp
sc
3o 2+ 3- 1+ 2- 2o 2o 2-
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- SE W. Limb 7 days later: NW- SW-
Indices
Rz: 55 10cm flux: 104 Flare: 41/23.4 Ca: 16.4 Ip: 0 Ia: 0
Solar Regions
Sunspots

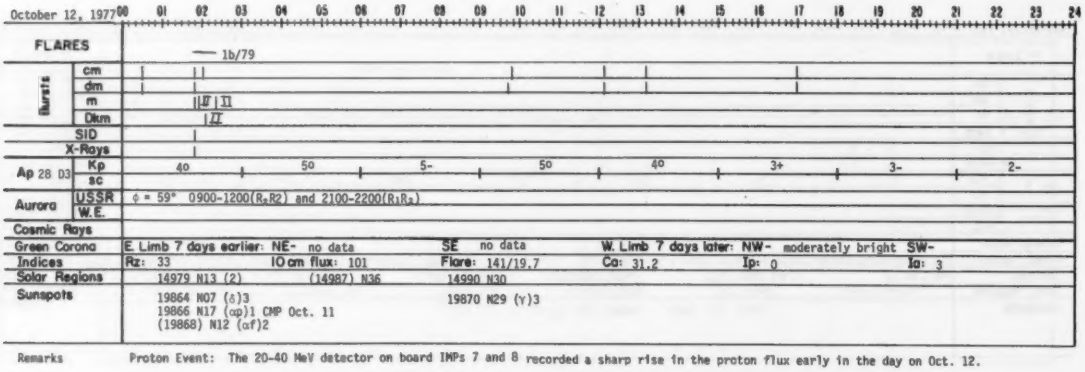

October 7, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap 3 Q2
Kp
sc
0+ 0+ 1- 2- 1o 0+ 1- 1-
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- SE- W. Limb 7 days later: NW- SW-
Indices
Rz: 57 10cm flux: 106 Flare: 32/22.8 Ca: 19.7 Ip: 0 Ia: 0
Solar Regions
(14977) N30 (14988) N20
Sunspots
19869 N20 (ap)2


October 8, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
1n/79
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap 6
Kp
sc
1- 2- 1o 1+ 2o 2- 3- 1o
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- SE W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 52 10cm flux: 104 Flare: 25/22.2 Ca: 22.2 Ip: 0 Ia: 0
Solar Regions
(14981) N39 14982 S34 14975 N24(4)
Sunspots
(19865) S34 (ap)2 (19862) N18 (ap)3









Remarks Proton Event: The 20-40 MeV detector on board IMPs 7 and 8 recorded a sharp rise in the proton flux early in the day on Oct. 12.

October 13, 1977

		00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES		
Bursts	cm	
	dm	
	m	
	Dkm	
SID		
X-Rays		
Ap 14	Kp	2- 4o 3+ 3- 4o 1+ 2+ 3-
	sc	
Aurora	USSR	ϕ = 58° 1700-1900(R,R1) and ϕ = 60° 2100-2200(HA1)
	W.E.	
Cosmic Rays		
Green Corona		E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- moderately bright SW-
Indices		Rz: 53 10cm flux: 99 Flare: 43/23.6 Ca: 33.6 Ip: 0 Ia: 1
Solar Regions		14992 S17 (14986) N37
Sunspots		

October 14, 1977

		00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES		
Bursts	cm	
	dm	
	m	noise storm
	Dkm	
SID		
X-Rays		
Ap 13	Kp	2- 00 0+ 4o 3- 2+ 3- 5-
	sc	1151(27)
Aurora	USSR	ϕ = 59° 2000-2400(HA1) and ϕ = 58° 2300(R,B4)
	W.E.	
Cosmic Rays		
Green Corona		E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW- moderately bright SW-
Indices		Rz: 48 10cm flux: 99 Flare: 37/20.1 Ca: 28.3 Ip: 0 Ia: 1
Solar Regions		14993 N19 (15003) S24
Sunspots		19871 N18 (βp)4

October 15, 1977

		00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES		
Bursts	cm	
	dm	
	m	noise storm
	Dkm	
SID		
X-Rays		
Ap 19	Kp	4+ 2+ 5- 4+ 2- 2- 3o 3-
	sc	
Aurora	USSR	ϕ = 59° 0000-0200(HA1)
	W.E.	
Cosmic Rays		
Green Corona		E. Limb 7 days earlier: NE- SE- W. Limb 7 days later: NW- no data SW- no data
Indices		Rz: 54 10cm flux: 99 Flare: 6/20.1 Ca: no data Ip: 0 Ia: 1
Solar Regions		
Sunspots		

Remarks Proton Event: The satellite-level proton flux enhancement, which IMPs 7 and 8 detected on Oct. 12, decayed to background level by the end of the day.

October 16, 1977

		00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES		
Bursts	cm	
	dm	
	m	ns noise storm
	Dkm	
SID		
X-Rays		
Ap 8	Kp	2+ 3o 1o 1o 2o 2- 2- 2+
	sc	
Aurora	USSR	
	W.E.	
Cosmic Rays		
Green Corona		E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW- no data SW- no data
Indices		Rz: 53 10cm flux: 98 Flare: 14/22.5 Ca: 21.9 Ip: 0 Ia: 3
Solar Regions		14984 N22 (2) (14999) N03
Sunspots		19867 N18 (βp)4 CMP Oct. 15 19873 N23 (αp)3 CMP Oct. 15 19874 N23 (β)4 (19877) N23 (αp)2 CMP Oct. 15

October 17, 1977

		00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES		
Bursts	cm	
	dm	
	m	ns → ← noise storm →
	Dkm	
SID		
X-Rays		
Ap 12	Kp	2+ 3o 2+ 2o 2+ 3+ 3- 3+
	sc	
Aurora	USSR	ϕ = 60° 1700(R,A2)
	W.E.	
Cosmic Rays		
Green Corona		E. Limb 7 days earlier: NE- SE- W. Limb 7 days later: NW- SW-
Indices		Rz: 51 10cm flux: 96 Flare: 0/23.3 Ca: 17.1 Ip: 0 Ia: 1
Solar Regions		15000 N40
Sunspots		

October 18, 1977

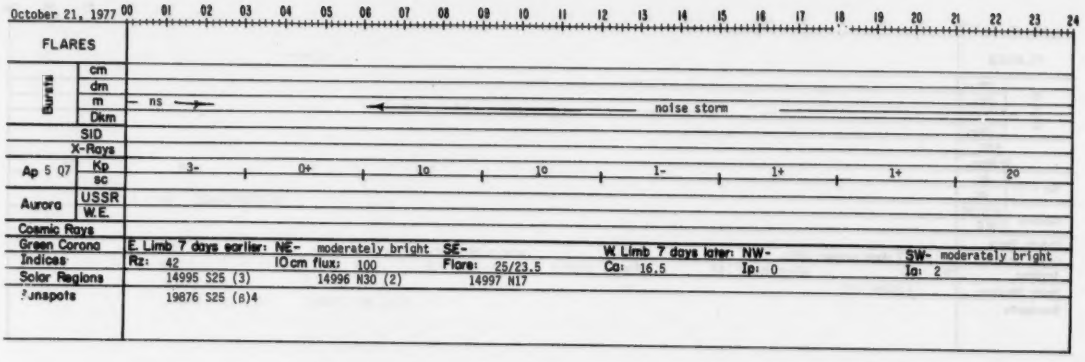
		00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES		
Bursts	cm	
	dm	
	m	ns → ← noise storm →
	Dkm	
SID		
X-Rays		
Ap 22	Kp	3+ 3+ 4- 3- 2+ 3o 4+ 5o
	sc	
Aurora	USSR	ϕ = 59° 1300-1400(HA1) and ϕ = 60° 1900-2000(SA2)
	W.E.	
Cosmic Rays		
Green Corona		E. Limb 7 days earlier: NE- SE W. Limb 7 days later: NW- SW- moderately bright
Indices		Rz: 50 10cm flux: 96 Flare: 17/21.7 Ca: 21.2 Ip: 0 Ia: 3
Solar Regions		(15001) N24
Sunspots		(19875) N22 (ap)1

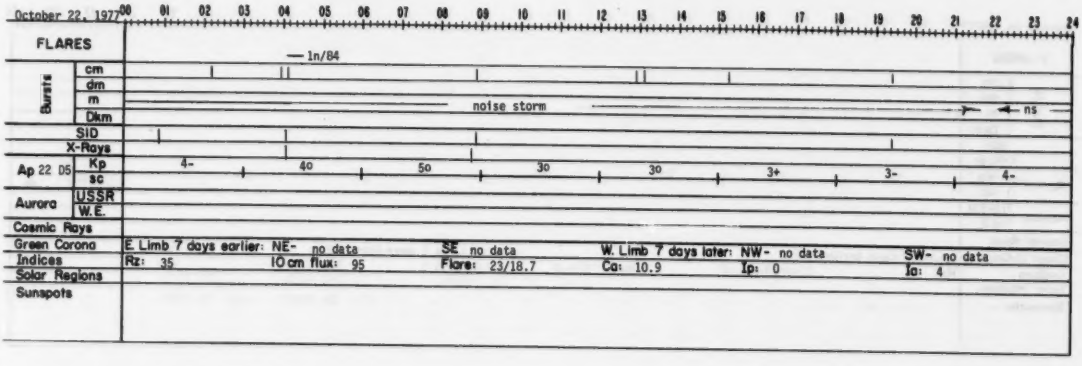
October 19, 1977

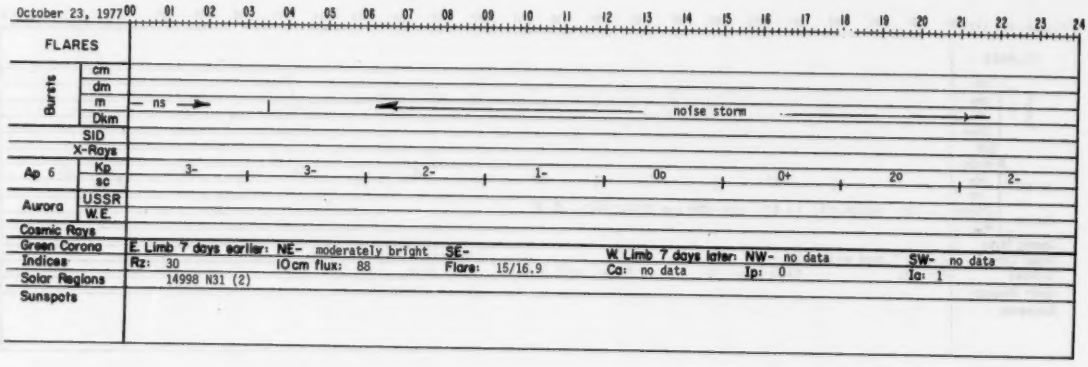
		00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES		
Bursts	cm	
	dm	
	m	noise storm → ← ns
	Dkm	
SID		
X-Rays		
Ap 2804	Kp	6o 5o 4+ 3+ 3+ 3+ 2+ 0+
	sc	
Aurora	USSR	ϕ = 59° 1200-1300(HB1) and ϕ = 60° 1700-2200(HA1)
	W.E.	
Cosmic Rays		
Green Corona		E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- SW- moderately bright
Indices		Rz: 54 10cm flux: 106 Flare: 24/21.3 Ca: 23.1 Ip: 0 Ia: 0
Solar Regions		14994 S23 (2) 14991 N24
Sunspots		19872 N24 (ap)2

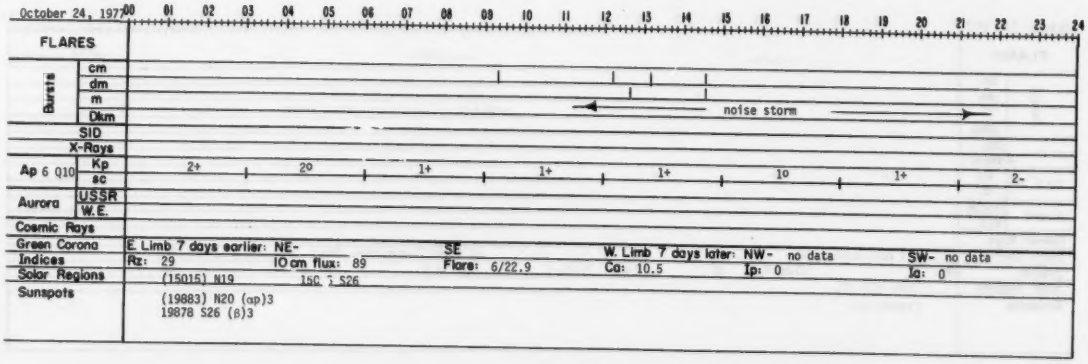
October 20, 1977

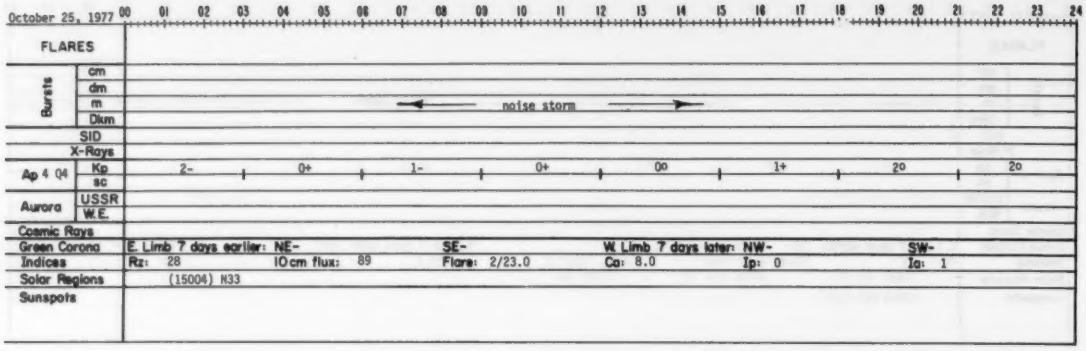
		00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES		
Bursts	cm	1b/95
	dm	
	m	ns → ← noise storm
	Dkm	
SID		
X-Rays		
Ap 7	Kp	0o 1+ 1+ 2o 2+ 3o 1+ 2+
	sc	
Aurora	USSR	ϕ = 59° 1300-1400(HA1)
	W.E.	
Cosmic Rays		
Green Corona		E. Limb 7 days earlier: NE- moderately bright SE W. Limb 7 days later: NW- no data SW- no data
Indices		Rz: 54 10cm flux: 100 Flare: 29/22.8 Ca: 24.0 Ip: 0 Ia: 3
Solar Regions		
Sunspots		

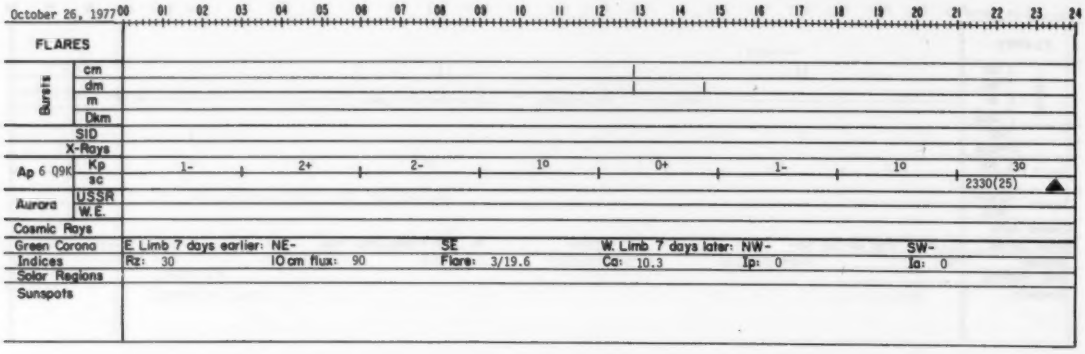

October 21, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
ns
noise storm
SID
X-Rays
Ap 5 Q7
Kp
sc
3- 0+ 1o 1o 1- 1+ 1+ 2o
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- moderately bright SE-
W. Limb 7 days later: NW- SW- moderately bright
Indices
Rz: 42 10cm flux: 100 Flare: 25/23.5 Ca: 16.5 Ip: 0 Ia: 2
Solar Regions
14995 S25 (3) 14996 N30 (2) 14997 N17
Sunspots
19876 S25 (β)4

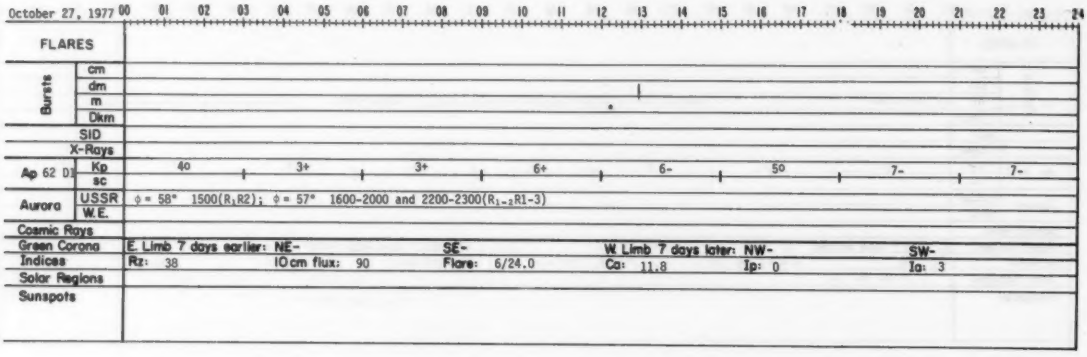

October 22, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
1n/84
Bursts
cm
dm
m
Dkm
noise storm
ns
SID
X-Rays
Ap 22 D5
Kp
sc
4- 4o 5o 3o 3o 3+ 3- 4-
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE no data
W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 35 10cm flux: 95 Flare: 23/18.7 Ca: 10.9 Ip: 0 Ia: 4
Solar Regions
Sunspots

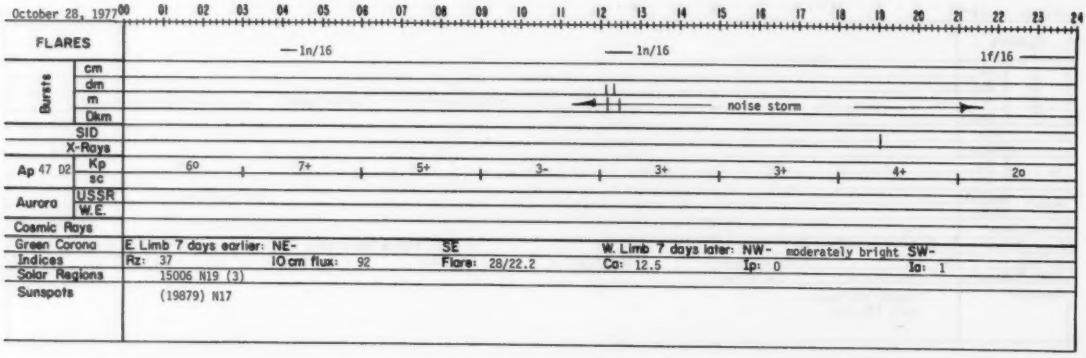

October 23, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
ns
noise storm
SID
X-Rays
Ap 6
Kp
sc
3- 3- 2- 1- 0o 0+ 2o 2-
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- moderately bright SE-
W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 30 10cm flux: 88 Flare: 15/16.9 Ca: no data Ip: 0 Ia: 1
Solar Regions
14998 N31 (2)
Sunspots

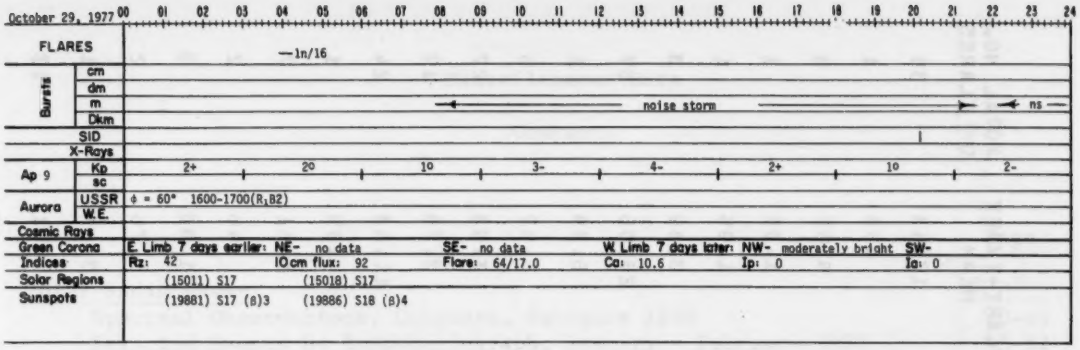

October 24, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap 6 Q10
Kp
sc
2+ 2o 1+ 1+ 1+ 1o 1+ 2-
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE-
SE
W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 29 10cm flux: 89 Flare: 6/22.9 Ca: 10.5 Ip: 0 Ia: 0
Solar Regions
(15015) N19 15C 7 S26
Sunspots
(19883) N20 (αp)3
19878 S26 (β)3

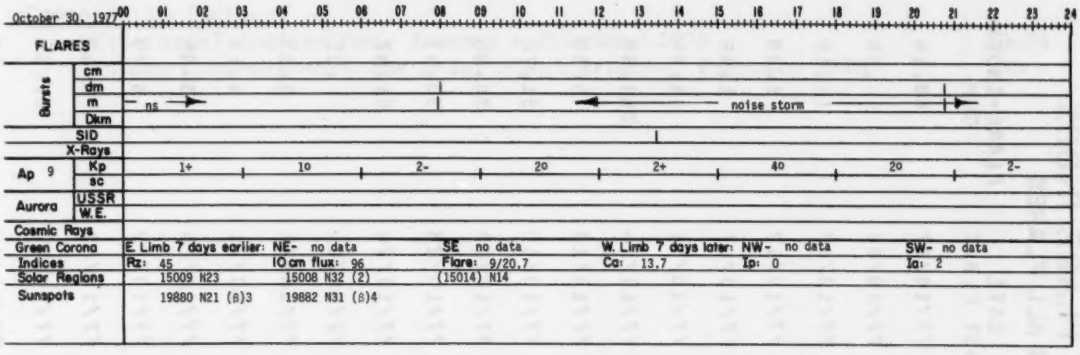

October 25, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap 4 Q4
Kp
2- 0+ 1- 0+ 00 1+ 20 20
sc
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- SE- W. Limb 7 days later: NW- SW-
Indices
Rz: 28 10cm flux: 89 Flare: 2/23.0 Ca: 8.0 Ip: 0 Ia: 1
Solar Regions
(15004) N33
Sunspots

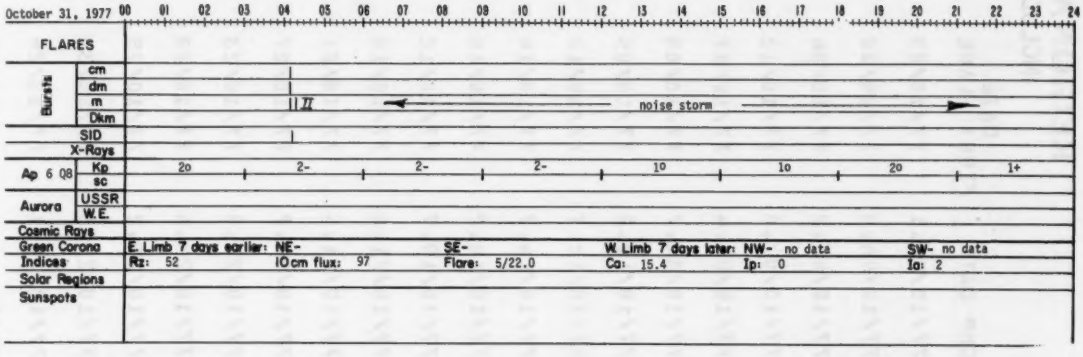

October 26, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
SID
X-Rays
Ap 6 Q9K
Kp
1- 2+ 2- 10 0+ 1- 10 30
sc
2330(25)
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- SE W. Limb 7 days later: NW- SW-
Indices
Rz: 30 10cm flux: 90 Flare: 3/19.6 Ca: 10.3 Ip: 0 Ia: 0
Solar Regions
Sunspots


October 27, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
SID
X-Rays
Ap 62 D1
Kp
40 3+ 3+ 6+ 6- 50 7- 7-
sc
Aurora
USSR
φ = 58° 1500(R1R2); φ = 57° 1600-2000 and 2200-2300(R1-2R1-3)
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- SE- W. Limb 7 days later: NW- SW-
Indices
Rz: 38 10cm flux: 90 Flare: 6/24.0 Ca: 11.8 Ip: 0 Ia: 3
Solar Regions
Sunspots


October 28, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
1n/16
1n/16
1f/16
Bursts
cm
dm
m
noise storm
Dkm
SID
X-Rays
Ap 47 D2
Kp
60 7+ 5+ 3- 3+ 3+ 4+ 20
sc
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- SE W. Limb 7 days later: NW- moderately bright SW-
Indices
Rz: 37 10cm flux: 92 Flare: 28/22.2 Ca: 12.5 Ip: 0 Ia: 1
Solar Regions
15006 N19 (3)
Sunspots
(19879) N17


October 29, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
—1n/16
Bursts
cm
dm
m
noise storm
ns
Dkm
SID
X-Rays
Ap 9
Kp
2+ 2o 1o 3- 4- 2+ 1o 2-
sc
Aurora
USSR
ϕ = 60° 1600-1700(R,B2)
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data
SE- no data
W. Limb 7 days later: NW- moderately bright
SW-
Indices
Rz: 42
10cm flux: 92
Flare: 64/17.0
Ca: 10.6
Ip: 0
Ia: 0
Solar Regions
(15011) S17
(15018) S17
Sunspots
(19881) S17 (8)3
(19886) S18 (8)4


October 30, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
ns
noise storm
Dkm
SID
X-Rays
Ap 9
Kp
1+ 1o 2- 2o 2+ 4o 2o 2-
sc
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data
SE no data
W. Limb 7 days later: NW- no data
SW- no data
Indices
Rz: 45
10cm flux: 96
Flare: 9/20.7
Ca: 13.7
Ip: 0
Ia: 2
Solar Regions
15009 N23
15008 N32 (2)
(15014) N14
Sunspots
19880 N21 (8)3
19882 N31 (8)4


October 31, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
II II
noise storm
Dkm
SID
X-Rays
Ap 6 08
Kp
2o 2- 2- 2- 1o 1o 2o 1+
sc
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE-
SE-
W. Limb 7 days later: NW- no data
SW- no data
Indices
Rz: 52
10cm flux: 97
Flare: 5/22.0
Ca: 15.4
Ip: 0
Ia: 2
Solar Regions
Sunspots

REGIONAL FLARE INDEX

INCLUDES ALL FLARES

MC MATH PLAGE NO.	LAT	CMP DATE	DATE FIRST FLARE	DATE LAST FLARE	FLARE-INDEX SUM	FLARE-INDEX MEAN	TOTAL NO. OF FLARES
14967	N33	77/10/02.1	77/10/03	77/10/07	88.14	17.63	35
14970	S23	77/10/04.9	77/09/30	77/09/30	.50	.50	1
14969	N21	77/10/05.2	77/10/06	77/10/07	11.10	5.55	3
14988	N20	77/10/07.8	77/10/12	77/10/12	1.00	1.00	1
14982	S34	77/10/08.4	77/10/07	77/10/07	1.95	1.95	1
14975	N23	77/10/08.7	77/10/09	77/10/11	11.54	3.85	3
14979	N13	77/10/12.2	77/10/05	77/10/14	280.58	28.06	67
14990	N30	77/10/12.7	77/10/13	77/10/13	6.39	6.39	1
14993	N18	77/10/14.7	77/10/14	77/10/19	21.72	3.62	6
14984	N22	77/10/16.2	77/10/10	77/10/22	38.96	3.00	27
14991	N25	77/10/19.7	77/10/12	77/10/23	33.47	2.79	13
14995	S25	77/10/21.4	77/10/18	77/10/24	81.42	11.63	24
14996	N30	77/10/21.4	77/10/21	77/10/21	.85	.85	1
15015	N19	77/10/24.7	77/10/27	77/10/31	8.03	1.61	7
15005	S26	77/10/24.8	77/10/23	77/10/31	4.13	.46	2
15006	N19	77/10/28.4	77/10/22	77/10/24	3.05	1.02	3
15011	S17	77/10/29.2	77/10/25	77/10/29	8.79	1.76	2
15018	S18	77/10/29.3	77/10/30	77/10/30	3.48	3.48	1
15009	N23	77/10/30.1	77/10/26	77/10/30	57.54	11.51	13
15008	N32	77/10/30.2	77/10/23	77/11/03	11.02	.92	4

Miscellaneous Data

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SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

FEBRUARY 1978

FEB 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
01	0000	0727	CULG				0000	0705					IIIN,W
			CULG				0050	0200					IS,W
			CULG				0443.5	0445	1	0444	0445	1	IIIG
			CULG	0700	0705	1	0659	0705	1				IIIGG
	2045	2400	CULG				2045	2400	1				IIIN
			CULG				2208	2210	2				IIIG
			CULG	2357	2402	1							IIIGG
02	0000	0745	CULG				0000	0745	1				IIIN
			CULG				0202	0203	1				IIIG
			CULG	0205.5	0207	2	0205.5	0207	2				IIIG,V
			CULG				0555	0745					IN,W
			CULG	0700	0701.5	1	0700	0701.5	2				IIIG,V,U
			CULG				0725		2				IIIB
	2046	2400	CULG	2046	2400	1	2046	2400	1				IS,C,DC
			CULG	2135	2400	1	2135	2400	1				IIIS
			CULG	2232.5	2233	1	2232.5	2233	3	2232.5	2233	1	IIIB
			CULG				2349		2	2349		1	IIIB
03	0000	0745	CULG	0000	0745	1	0000	0530	1				IS,C,DC
			CULG	0000	0745	1							IIIN
			CULG				0000	0555	1				IIIS
			CULG	0440	0526	2							CONT
			CULG	0449.5		2	0449.5		2				IIIB
			CULG				0530	0745	2				IS,C,DC
			CULG				0535	0536	3	0535	0536	2	IIIG
			CULG				0555	0745	2				IIIS
	2046	2400	CULG	2046	2400		2046	2400					IS,W
			CULG	2046	2400	2	2046	2400	2	2046	2400	2	IIIGN
			CULG	2103	2104.5	2	2103.5	2105.5	3	2103.5	2105.5	2	IIIGG,V
			CULG	2114	2116	2	2114	2116	3	2115	2116	2	IIIGG
			CULG	2147	2148	2	2144	2148	3	2146	2148	3	IIIGG,V
			CULG	2214	2217	2	2214	2217	3	2214	2216	2	IIIGG
			CULG	2237.5	2239.5	3	2237.5	2239.5	3	2238	2239.5	3	IIIG,V
			CULG	2302.5	2306	2	2302.5	2306	3	2303	2306	2	IIIGG
04	0000	0746	CULG	0000	0315		0000	0315					IN,W
			CULG	0000	0746	2	0000	0746	2	0000	0746	2	IIIN
			CULG				0251	0251.5	2				IIIG
			CULG				0255.5	0256	2				IIIG
			CULG	0315	0540	1	0315	0540	1				IS,C,DC
			CULG	0435.5	0437.5	2	0435.5	0437.5	3	0435	0437.5	3	IIIGG
			CULG	0540	0746		0540	0746					IS,W
			CULG				0611	0611.5	2				IIIG
	2046	2400	CULG	2046	2400		2046	2400					IS,W
			CULG	2046	2400	1	2046	2400	1				IIIN
05	0000	0746	CULG	0000	0746		0000	0746					IS,W
			CULG	0000	0746		0000	0720					IIIN,W
			CULG				0700	0746	1				IS,C,DC
			CULG				0735	0746	1				IIIS
	2046	2400	CULG	2046	2400	1	2046	2400	1				IS
			CULG				2046	2400					IIIS,W
06	0000	0728	CULG	0000	0728	1	0000	0728	1				IS,DC
			CULG				0000	0728					IIIS,W
	2046	2400	CULG	2046	2400	1	2046	2400	1				IS,C,DC
			CULG	2046	2400	1							IIIN
			CULG				2046	2400					IIIS,W
07			CULG	0000	0746	1	0000	0313	1				IIIN
			CULG				0000	0746					IIIS,W
	0000	0746	CULG	0000	0746	1	0000	0746	1				IS,C,DC
			CULG				0118.5	0119	1	0118.5	0119	1	IIIG
			CULG	0425	0426	2	0425	0426	2				IIIG,U
			CULG	0649	0650	2	0649	0650	2				IIIG,U
			CULG				2046	2400	1				IIIS
	2046	2400	CULG	2046	2400	1	2046	2400	2				IS,C,DC
			CULG	2046	2400	1							IIIN
08	0000	0746	CULG	0000	0746	1	0000	0746	1				IS,C,DC

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

FEBRUARY 1978

FEB 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
08			CULG	0000	0746	1	0000	0746	2				IIIN
			CULG				0000	0746	1				IIIS
			CULG				0128		2				IIIB,U
			CULG				0324		2				IIIB
			CULG				2046	2400	1				IIIS
	2046	2400	CULG	2046	2400	2	2046	2400	2				IS,C,DC
			CULG	2046	2400	1	2046	2400	2				IIIN
			CULG				2225	2226	2				IIIG
			CULG				2342	2343	2	2342	2343	1	IIIG
09	0000	0746	CULG	0000	0746	1	0000	0746	1				IS,C,DC
			CULG	0000	0746	1	0000	0746	2				IIIN
			CULG				0000	0746	1				IIIS
			CULG				0057.5	0102	2				IIIGG
	2046	2400	CULG	2046	2400	1	2046	2400	2				IS,C,DC
			CULG	2046	2400	1	2046	2400	2				IIIN
			CULG				2046	2400	1				IIIS
10			CULG				0000	0746	1				IIIS
	0000	0746	CULG	0000	0746	1	0000	0746	1				IS,C,DC
			CULG	0043	0045	2	0043.5	0046.5	3	0043.5	0046	1	IIIGG,V
			CULG	0043	0746	1	0247	0746	2	0000	0746	1	IIIN
			CULG	0333	0335	1	0332.5	0335	2	0333	0335	2	IIIGG
			CULG	0542.5	0543.5	1	0541.5	0544	2	0542.5	0543	1	IIIGG
			CULG				0546	0549	2	0546	0547	2	IIIGG
	2046	2400	CULG	2046	2400	1	2046	2400	2				IS,C,DC
			CULG	2046	2400	1	2046	2400	2	2046	2400	2	IIIN
			CULG				2046	2400	1				IIIS
			CULG	2113	2137	2	2123	2230	2				IV
			CULG							2113	2140	1	SWF
			CULG				2115	2128	2				II
			CULG	2125	2126	2	2125	2126	2				IIIG
			CULG	2128	2131	1	2129	2132	2				IIIGGV
			CULG	2134	2136	1	2136	2138	2				IIIG,V
			CULG				2256		2	2256		2	IIIB
			CULG				2258	2258.5	2				IIIG
11			CULG	0000	0723	1	0000	0723	2	0000	0723	1	IIIG,N
			CULG				0000	0723	1				IIIS
	0000	0723	CULG	0000	0723	1	0000	0723	2				IS,C,DC
			CULG	0015.5	0016.5	1	0015.5	0017	3	0015.5	0017	2	IIIG,V
			CULG	0319	0323	2	0319.5	0323	3	0319	0323	3	IIIGG,V
			CULG	0510	0515	1	0510	0515	1	0510	0515	1	IIIGG
			CULG				2046	2400	2				IIIS
	2046	2400	CULG	2046	2400	1	2046	2400	2				IS,C,DC
			CULG	2046	2400	2	2046	2400	2	2046	2400	2	IIIGN
			CULG	2120	2122	1	2120	2123	3	2120	2122	1	IIIGG,V
			CULG	2135	2148	2	2135	2149	3	2146	2148	2	IIIGG
			CULG	2155.5	2157.5	2	2155	2157.5	3	2155	2156	2	IIIGG
12			CULG	0000	0746	1	0000	0746	2	0000	0746	2	IIIGN
			CULG				0000	0746	2				IIIS
	0000	0746	CULG	0000	0746	1	0000	0746	2				IS,C,DC
			CULG	0132	0132.5	2	0132	0132.5	3	0132	0133	2	IIIG
			CULG	0136	0140	2	0135.5	0140	3	0136	0140	1	IIIGG,V
			CULG	0523	0524	1	0523.5	0525	3	0522.5	0524	3	IIIGG
			CULG				2046	2400	2				IIIS
	2046	2400	CULG	2046	2400	1	2046	2400	2				IS,C,DC
			CULG				2046	2400	1				N,RS,DP
			CULG	2046	2400	1				2046	2400	1	IIIN
			CULG				2046	2400	1				N,RS,DP
			CULG				2046	2400	2				IIIS
			CULG	2247	2400	1	2247	2400	2	2247	2400	2	IIIN
			CULG				2248	2249.5	1	2248	2249.5	1	IIIG
			CULG				2345	2345.5	1	2345	2345.5	2	IIIGV
			CULG				2349.5	2351	1	2349.5	2351	1	IIIG
13	0000	0746	CULG	0000	0746	1	0000	0746	2				IS,C,DC
			CULG				0000	0746	1				N,RS,DP
			CULG				0000	0600	1				IIIS

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

FEBRUARY 1978

FEB 1978	TIMES OF OBSERVATION START UT	TIMES OF OBSERVATION END UT	STATION	EVENTS DECIMETRIC BAND START UT	DECIMETRIC BAND END UT	DECIMETRIC BAND INT	METRIC BAND START UT	METRIC BAND END UT	METRIC BAND INT	DEKAMETRIC BAND START UT	DEKAMETRIC BAND END UT	DEKAMETRIC BAND INT	SPECTRAL TYPE
13			CULG							0130	0455	1	SWF
			CULG				0134	0400	2				IV
			CULG				0138	0200	2	0154	0209	2	II
			CULG				0226	0233	1				III,RS
			CULG	0244	0340	2							N,FASTDRIF
			CULG	0407.5	0413	2							FAST DRIFT
			CULG	0408	0413	2	0409.5	0415	3	0409.5	0413	3	IIIGG
			CULG	0409	0746	2	0345	0746	2	0345	0746	2	IIIN
			CULG				0418	0530	2				DP
			CULG				0428		2				RS,DP
			CULG				0434	0435.5	3	0434	0435.5	3	IIIG
			CULG	0442	0449	3	0442	0452	3	0442	0449	3	IIIGG
			CULG				0541	0543	3	0541	0543	3	IIIG
			CULG				0545.5	0546.5	3	0545.5	0546.5	3	IIIG
			CULG				0600	0746	2				IIIS
	2046	2400	CULG	2046	2400	1	2046	2400	2				IS,C,DC
			CULG				2046	2400	2				S,RS,DP
			CULG	2046	2400	2				2046	2400	1	IIIN
			CULG				2046	2400	2				IIIS
14	0000	0746	CULG	0000	0746	1	0000	0746	2				IS,C,DC
			CULG	0000	0746	1				0000	0746	1	IIIN
			CULG				0000	0746	2				S,RS,DP
			CULG				0000	0746	2				IIIS
			CULG				0454	0456	3	0454	0455	1	IIIG,V
	2046	2400	CULG	2046	2400	1	2046	2400	1				IS,C,DC
15			CULG	0000	0746	1	0000	0746	2	0000	0746	2	IIIN
			CULG				0000	0746	1				N,RS,DP
			CULG				0000	0610	1				IIIS
	0000	0746	CULG	0000	0746	1	0000	0746	2				IS,DC,C
			CULG	0353	0353.5	2	0352.5	0354	3	0353	0353.5	2	IIIG
			CULG	0400.5	0402	2							UNCLF
			CULG	0402	0402.5	2	0402	0403	3	0402	0402.5	3	IIIG
			CULG	0458.5	0502	2	0458.5	0502	3	0459	0501.5	2	IIIGG
			CULG	0543.5	0547.5	2	0544	0547.5	3	0544	0547.5	2	IIIGG
			CULG				0610	0746	2				IIIS
			CULG	0656.5	0701	2	0656	0700	3	0656.5	0659	1	IIIGG
			CULG	0710	0713	2	0710	0714	3	0710	0712	1	IIIGG
			CULG	2046	2400	1	2046	2400	2	2046	2400	2	IIIN
			CULG				2046	2400	1				IIIS
	2046	2400	CULG	2046	2400	1	2046	2400	2				IS,C,DC
			CULG				2139.5	2141	3	2139.5	2140	3	IIIG
			CULG				2143	2144	3	2143.5	2144	3	IIIG
			CULG	2225.5	2238	3	2225.5	2239.5	3	2225.5	2239.5	3	IIIGG
			CULG				2240	2300	2	2252	2258	2	II, HB
			CULG				2254	2255	1	2254	2255	1	RD
			CULG				2258	2400	2				IV
16	0000	0746	CULG				0000	0345	2				IV
			CULG				0000	0746	2				IIIS
			CULG	0000	0746	1	0000	0746	2				IS,C,DC
			CULG	0000	0746	2	0000	0746	2	0000	0746	2	IIIN
			CULG	0015.5	0018.5	2	0015.5	0019	3	0016	0020	3	IIIGG,V
			CULG	0607.5	0622	2	0607.5	0622	3	0607.5	0621	3	IIIGG
			CULG	0608	0617	2							CONT
			CULG	0631	0637.5	2	0631	0637.5	3	0631	0637.5	2	IIIGG
	2046	2400	CULG	2046	2400	1	2046	2400	2				IS,C,DC
			CULG				2046	2400	2				N,RS,DP
			CULG				2046	2400	2				IIIS
			CULG	2046	2400	2							N,FASTDRIF
			CULG	2046	2400	2	2046	2400	2	2046	2400	2	IIIN
			CULG	2127.5	2136.5	3	2127.5	2136.5	2				IIIGG
			CULG	2248	2248.5	2	2248	2249	3	2248	2249	3	IIIG
17			CULG	0000	0746	2							FAST DRIFT
			CULG	0000	0746	2	0000	0746	2	0000	0746	2	IIIN
			CULG				0000	0746	1				IIIS
	0000	0746	CULG	0000	0746		0000	0746	1				IS,C,DC
			CULG				0000	0746	1				N,RS,DP

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

FEBRUARY 1978

FEB 1978	TIMES OF OBSERVATION START UT	TIMES OF OBSERVATION END UT	STATION	EVENTS DECIMETRIC BAND START UT	DECIMETRIC BAND END UT	DECIMETRIC BAND INT	METRIC BAND START UT	METRIC BAND END UT	METRIC BAND INT	DEKAMETRIC BAND START UT	DEKAMETRIC BAND END UT	DEKAMETRIC BAND INT	SPECTRAL TYPE
17			CULG	0254	0316	3	0254	0317	3	0254	0316	3	IIIGG
			CULG				0314	0338	2				II
			CULG							0315	0330	1	SWF
			CULG	0513	0515	1	0513	0516	3	0513.5	0516	3	IIIGG,V
			CULG	0646.5	0647.5	1	0646.5	0647.5	3	0646.5	0647	2	IIIGG
			CULG	0652.5	0653	3	0652.5	0654	3	0653	0654	2	IIIGG
	2046	2400	CULG	2046	2400	1	2046	2400	1				IS,DC,C
			CULG	2046	2400	2	2046	2400	2	2046	2400	2	IIIN
			CULG				2046	2400	1				N,RS,DP
			CULG				2046	2400	1				IIIS
			CULG	2049	2051	1	2046	2052	3	2046	2051	3	IIIGG
18			CULG				0000	0746	1				N,RSDP
			CULG	0000	0746	2	0000	0746	2	0000	0746	2	IIIN
			CULG				0000	0746					IIIS,W
	0000	0746	CULG	0000	0746	1	0000	0746	1				IS,C,DC,W
			CULG	0207	0208	2	0207	0210	3	0208	0210	3	IIIG,V,U
	2046	2400	CULG	2046	2400		2046	2400					IS,DC,W
			CULG				2046	2400	1				N,RSDP
			CULG				2046	2400	1				IIIS
			CULG	2046	2400	2	2046	2400	2	2046	2400	2	IIIN
			CULG				2148.5	2151	2				IIIGG,V,U
19			CULG				0000	0746	1				IIIS
	0000	0746	CULG	0000	0746	1	0000	0746	1				IS
			CULG	0000	0411	2	0000	0746	2	0000	0422	2	IIIN
			CULG				0007.5	0011.5	2				IIIGG,U
			CULG				2046	2400	1				IIIS
	2046	2400	CULG	2046	2400	1	2046	2400	1				IS
			CULG	2046	2319	1	2046	2400	2	2046	2310	1	IIIN
20	0000	0746	CULG	0000	0746		0000	0746					IS,DC,W
			CULG				0000	0746					IIIS,W
			CULG				0522	0522.5	2				IIIG
			CULG	0620	0746	1	0000	0746	2	0145	0746	1	IIIN
	2046	2400	CULG	2046	2400		2046	2400					IS,W
			CULG				2046	2400	2	2243	2345	1	IIIN
			CULG				2046	2400					IIIS,W
21			CULG				0000	0634	2	0000	0634	1	IIIN
			CULG				0000	0746					IIIS,W
	0000	0746	CULG	0000	0746		0000	0746					IS,W
	2046	2157	CULG	2046	2157		2046	2157					IN,W
			CULG				2046	2157	1				IIIS
			CULG				2120	2157	2				IIIN
22			CULG	0425	0746	2	0425	0746	1				IIIN
	0425	0746	CULG	0425	0746		0425	0746					IN,W
			CULG				2046	2400					IIIS,W
	2046	2400	CULG	2046	2400		2046	2400					IS,DC,W
			CULG				2153	2306	2	2153	2306	1	IIIN
23	0000	0746	CULG	0000	0746		0000	0746					IS,W
			CULG				0000	0746					IIIS,W
			CULG				0510	0511	2	0510	0511	1	IIIG
			CULG				2046	2400					IIIS,W
	2046	2400	CULG				2046	2400	1				IS,DC
24			CULG				0000	0120					IIIS,W
	0000	0745	CULG				0000	0745	1				IS,DC
			CULG	0042	0049		0042	0049					IIIGG,W
			CULG				0051	0106	2				II
			CULG	0337.5	0338.5	1	0337.5	0338.5	1				IIIG,U
			CULG				0426	0745	2	0426	0636	2	IIIGN
			CULG	0735	0737.5	2	0735	0737.5	2				IIIGG,U
	2045	2400	CULG				2045	2400					IS,DC,W
			CULG	2350.5		2	2350.5		2				IIIB
25			CULG	0306.5	0312	1	0307.5	0311	1				IIIG,U
			CULG							0310	0322	1	SWF

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

FEBRUARY 1978

FEB 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
25			CULG				0310	0326	2				II
			CULG	0313.5	0315.5	1	0313.5	0315.5	1				IIIG,U
			CULG	0315.5	0316.5								FASTDRIFTW
	0000	0745	CULG	0445	0745		0000	0745					IS,W
	2045	2400	CULG	2331	2334								IIIG,W
26	0000	0745	CULG	0103	0231	1							IIIN
			CULG	0611	0614	1							IIIG
			CULG				0652.5	0718	2				II
	2045	2400	CULG				2045	2400					IIIN,W
			CULG	2326.5	2328	1							IIIG,RS
27	0000	0745	CULG	0103	0745	1	0103	0745	1				IIIN
			CULG				0308	0545	1				IS
			CULG				0308	0545	1				IIIS
			CULG	0559.5	0602.5	2	0559.5	0602.5	2				IIIG,V
	2045	2400	CULG				2158.5	2200	2				IIIG,U
28	0000	0740	CULG	0116	0116.5	1	0116	0116.5	2				IIIG,U
	2045	2400	CULG				2252	2253					IIIG,U,W

The symbols used in connection with the spectral type in describing the important bursts are as follows:

B = Single burst
G = Small group (< 10) of bursts
GG = Large group (> 10) of bursts
C = Underlying continuum (particularly with type I)
S = Storm in the sense of intermittent but apparently connected activity
N = Intermittent activity in this period
U = U-shaped burst of Type III

RS = Reverse slope burst
DP = Drifting pairs
DC = Drifting Chains
H = Herringbone
W = Weak
P = Pulsations
CONT = Continuum
UNCLF = Unclassified activity

SELECTED SOLAR EVENTS

JANUARY 1978

Culgoora

UT Date 1978. JANUARY	HELIOGRAPH EVENT							Spectral Type	REMARKS
	Start (UT)	End (UT)	Freq. (MHz)	Positions: Central Dist. ($R_\odot$)	Positions: Position Angle (Deg.)	Polarization	Intensity (1-3)		
31/1	2300	0500	160	.2	270	R	2	$\overline{\text{I}}$	Type $\overline{\text{I}}$ emission from this region until 2nd.
1/2	2300	0500	43.25) 80) 160)	.1	180	R	2	$\overline{\text{I}}$	This region produced type $\overline{\text{I}}$ & $\overline{\text{III}}$activity until 8th.
	2244	2400	43.25) 80) 160)	.1	180	R	2	$\overline{\text{IV}}$	Type $\overline{\text{II}}$, $\overline{\text{IV}}$ began before start of observing period at 22^h44^m.
3	0307	0309	43.25 80) 160)	.3) .2) 0	325 0	-	3	$\overline{\text{III}}$G	*
4	0408	0412	43.25) 80) 160)	.3	250 230	-	3	$\overline{\text{III}}$GG	*
6	0153	0154	43.25) 80) 160)	.9	240 235	-	3	$\overline{\text{III}}$G	
	0405	0407	43.25) 80) 160)	1.1 .9	90 100	-	2 2 1	$\overline{\text{III}}$G	*
7	0110	0111	43.25) 80) 160	1.0 .9	250 240	-	3	$\overline{\text{III}}$G	*
	0119	0407	43.25) 80) 160)	1.0 .9	250 240	R	3	CONTINUUM.	

Days without Heliograph observations: 20th, 21st.

* Other type $\overline{\text{III}}$'s observed at same position during the day.

SELECTED SOLAR EVENTS

JANUARY 1978

Culgoora

UT Date 1978. JANUARY	HELIOGRAPH EVENT							Spectral Type	REMARKS
	Start (UT)	End (UT)	Freq. (MHz)	Positions: Central Dist. ($R_\odot$)	Positions: Position Angle (Deg.)	Polarization	Intensity (1-3)		
8	0208	0402	43.25) 80) 160)	1.3 1.2 1.0	270 260	Unpol	3-2)))	Type II, IV event complex source structure.	
9/10	2300	0500	160	1.1	260	Unpol	2	I	
10/11	2319	0050	A) 43.25) 80 160 B) 80 160	.8 3.0 2.0	270 260	Unpol	3 3 2 3 2	II & IV	Complex source structure. Type IV moved from position A to B at times indicated Becoming RH Polz. at $00^h 20^m$ 80, 160 MHz.
	0133	0135	43.25) 80) 160)	1.2 1.1 1.0	55	-	2	IIIB	
	0319	0332	43.25) 80) 160)	.3	280	-	3 3 1	II	
12/13	2300	0500	160	.1	120	Variable	1	I	Type I persisted from this region until 16th.
	0314	0318	43.25) 80) 160)	.1	120	-	- 3 2	IIIG	*
14/15	2300	0500	43.25) 80) 160)	1.3 1.0 .8	330	-	3 2 2	IIIS	

Days without Heliograph observations: ....20th., 21st.....

* Other type III's observed at same position during the day.

SELECTED SOLAR EVENTS

JANUARY 1978

Culgoora

UT Date 197.8 JANUARY	HELIOGRAPH EVENT							Spectral Type	REMARKS
	Start (UT)	End (UT)	Freq. (MHz)	Positions: Central Dist. ($R_\odot$)	Positions: Position Angle (Deg.)	Polarization	Intensity (1-3)		
26	0240	0252	43.25) 80) 160)	1.1	70	-	- 2 1	$\overline{\underline{111}}$GG,U	*
	0252	0322	80	1.1	0	L	2	$\overline{\underline{1}}$	Type $\overline{\underline{1}}$ activity persisted from this region until 30th.
27	2335	2400	160	1.1	110	variable	1	$\overline{\underline{1}}$	Type $\overline{\underline{1}}$ activity intermittently present until 31st.
	2349	2350	80) 160)	1.0	90	-	2 2	$\overline{\underline{111}}$G	*
29	0345	0348	43.25) 80) 160)	1.3 1.2 1.1	55	-	3	$\overline{\underline{111}}$G,$\overline{\underline{V}}$,U	

Days without Heliograph observations: ....20th, 21st.....

* Other type $\overline{\underline{111}}$'s observed at same position during the day.

SELECTED SOLAR EVENTS

FEBRUARY 1978

Culgoora

UT Date 1978. FEBRUARY	HELIOGRAPH EVENT							Spectral Type	REMARKS
	Start (UT)	End (UT)	Freq. (MHz)	Positions: Central Dist. ($R_\odot$)	Positions: Position Angle (Deg.)	Polarization	Intensity (1-3)		
2	2354	2355	160	.8	230	L	1	I	Type $\overline{\text{I}}$ activity persisted from this region from 1 - 4.
	2354	2356	80) 160)	.4) .3)	270	-	2	$\overline{\text{III}}$G	
	0032	0034	80) 160)	1.8) 1.3)	275	-	2	$\overline{\text{III}}$G	
	0205	0207	43.25) 80) 160)	1.5 1.3	65	-	3	$\overline{\text{III}}$G,$\overline{\text{V}}$	*
2/3	2310	0523	80) 160)	.7	220) 210)	R	1) 2)	$\overline{\text{I}}$	Type $\overline{\text{I}}$ activity persisted intermittently from this region 3-9.
	2329	2330	43.25) 80) 160)	1.0) .6)	330	-	3	$\overline{\text{III}}$G	*
	2347	2348	43.25) 80) 160)	.7	220) 210)	-	3	$\overline{\text{III}}$G	
	0058	0059	160	.6	330	L	2	$\overline{\text{I}}$	Type 1 activity persisted from this region 3-7.
	0442	0523	80) 160)	1.6 1.5	40	-	1) 2)	Slow drift continuum.	
3/4	2300	0500	80) 160)	1.1 .9	40	L))	1-2 2-3	$\overline{\text{I}}$	Type 1 activity from this region also on 5th.

Days without Heliograph observations: Nil

* Other type $\overline{\text{III}}$'s observed from same position during the day.

SELECTED SOLAR EVENTS

FEBRUARY 1978

Culgoora

UT Date 1978. FEBRUARY	HELIOGRAPH EVENT							Spectral Type	REMARKS
	Start (UT)	End (UT)	Freq. (MHz)	Positions: Central Dist. ($R_\odot$)	Positions: Position Angle (Deg.)	Polarization	Intensity (1-3)		
	2300	0500	160	.9	140	L	2	$\overline{\text{I}}$	
	0250	0252	43.25) 80) 160)	.9	245		3	$\overline{\text{III}}$G	*
5/6	2300	0500	80) 160)	1.2	55	R	1) 2)	$\overline{\text{I}}$	Type $\overline{\text{I}}$ activity persisted from this region 8-22.
7	0425	0426	80) 160)	1.3 1.2	50	-	3	$\overline{\text{III}}$G,U	
8/9	2300	0500	43.25) 80) 160)	1.0	40	Unpol R	2) 1) 2)	$\overline{\text{I}}$	
	0057	0102	43.25 80) 160)	1.0	40	-	2) 2) 3)	$\overline{\text{III}}$GG	*
	0112	0114	43.25) 80) 160)	1.3	260	-	3	$\overline{\text{III}}$G	*
9/10	2300	0500	160	.4	0	L	2	$\overline{\text{I}}$	Type $\overline{\text{I}}$ activity visible also on 12.
	2300	0500	80) 160)	1.0	320	L	2	$\overline{\text{I}}$	
	0043	0051	43.25) 80) 160)	1.0 .9 .8	65	-	3	$\overline{\text{III}}$GG,$\overline{\text{V}}$	*
10/11	2300	0047	43.25) 80)	1.4	320	Unpol	3) 2)	$\overline{\text{IV}}$	Type $\overline{\text{II}}$ occurred at 21^h15^m before start of heliograph observations

Days without Heliograph observations: Nil

* Other type $\overline{\text{III}}$'s observed from same position during the day.

SELECTED SOLAR EVENTS

FEBRUARY 1978

Culgoora

UT Date 197.8 FEBRUARY	HELIOGRAPH EVENT							Spectral Type	REMARKS
	Start (UT)	End (UT)	Freq. (MHz)	Positions: Central Dist. ($R_\odot$)	Positions: Position Angle (Deg.)	Polarization	Intensity (1-3)		
	0317	0324	43.25) 80) 160)	.8	45	-	3	$\overline{\underline{111}}$GG,$\overline{\underline{V}}$	*
11/12	2300	0500	80) 160)	.5	105	R	2) 3)	$\overline{\underline{I}}$	
	0135	0140	43.25) 80) 160)	1.6 1.4 1.2	45	-	3	$\overline{\underline{111}}$GG,$\overline{\underline{V}}$	*
12/13	2300	0500	160	.7	230	Varying	2	$\overline{\underline{I}}$	Type $\overline{\underline{I}}$ activity from this region persisted until 15th.
	0141	0205	43.25) 80) 160)	1.2	315	-	3	$\overline{\underline{II}}$	Complex source structure.
	0409	0415	43.25) 80) 160)	1.2	315	-	3	$\overline{\underline{111}}$GG	*
	0434	0435	43.25) 80) 160)	.7	230	-	3) 3) 2)	$\overline{\underline{111}}$G	*
15	0458	0502	43.25) 80) 160)	1.0	280	-	3) 3) 2)	$\overline{\underline{111}}$GG	*
15/16	2300	0500	80) 160)	1.0	50	L	2	$\overline{\underline{I}}$	Type $\overline{\underline{I}}$ activity persisted from this region until 19th.

Days without Heliograph observations: ..Nil.....

* Other type $\overline{\underline{111}}$'s observed from same position during the day.

SELECTED SOLAR EVENTS

FEBRUARY 1978

Culgoora

UT Date 197.8 FEBRUARY	HELIOGRAPH EVENT							Spectral Type	REMARKS
	Start (UT)	End (UT)	Freq. (MHz)	Positions		Polarization	Intensity (1-3)		
				Central Dist. ($R_\odot$)	Position Angle (Deg.)				
16	2259	0500	43.25) 80) 160)	.8	290	-	3	$\overline{1V}$	Type $\overline{11}$ occurred before start of heliograph observations at 22^h59^m, Type $\overline{1V}$ was in progress at start.
17	0253	0338	43.25) 80) 160)	.8	260		3	$\overline{11}$	
18	0206	0211	43.25) 80 160	1.5) 1.3) 1.2)	260	-	3) 3) 2)	$\overline{111}$G,$\overline{V}$,U	*
19	0007	0012	43.25) 80) 160)	1.5) 1.3) 1.2)	270	-	3) 3) 2)	$\overline{111}$GG,U	*
19/20	2300	0500	80) 160)	1.1	40	R	1) 2)	$\overline{I}$	Type $\overline{I}$ activity persisted until 28th.
	0117	0118	43.25) 80)	1.0	340		3	$\overline{111}$G	*
21	0046	0047	43.25) 80) 160)	1.2 1.0	280		3) 3) 2)	$\overline{111}$G	*
22	0205	0208	43.25) 80) 160)	1.0	280	-	2	$\overline{111}$G	*

Days without Heliograph observations: .....Nil.....

* Other type $\overline{111}$'s observed from same position during the day.

SELECTED SOLAR EVENTS

FEBRUARY 1978

Culgoora

UT Date 197.8 FEBRUARY	HELIOGRAPH EVENT							Spectral Type	REMARKS
	Start (UT)	End (UT)	Freq. (MHz)	Positions: Central Dist. ($R_\odot$)	Positions: Position Angle (Deg.)	Polarization	Intensity (1-3)		
23	0509	0512	43.25) 80)	1.5 1.1	310		3) 2)	$\overline{\underline{111}}$G	*
24	0052	0108	43.25) 80)	1.5 1.2	55		3	$\overline{\underline{11}}$	
	0427	0428	43.25) 80) 160)	1.5 1.2	55		3	$\overline{\underline{111}}$G	*
25	0306	0325	43.25) 80) 160)	1.3 1.1 1.0	330		2) 3) 2)	$\overline{\underline{111}}$G,U $\overline{\underline{11}}$	
27	0104	0105	80) 160)	1.0	320		2) 3)	$\overline{\underline{111}}$G	*
	0300	0306	43.25) 80) 160)	1.3	40		3) 2) 3)	$\overline{\underline{111}}$G	*
	0308	0517	80) 160)	1.3	40	L	2	$\overline{1}$	
28	0115	0118	80) 160)	1.0	35		3	$\overline{\underline{111}}$G,U	Complex source structure.

Days without Heliograph observations: Nil

* Other type $\overline{\underline{111}}$'s observed from same position during the day.

HOURLY EQUATORIAL Dst VALUES (PROVISIONAL)

JANUARY 1978

NASA/GODDARD SPACE FLIGHT CENTER

(Time-UT) (Units-Gammas)

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	-10	-12	-12	-8	-3	0	-3	-3	-4	-5	-4	-5	-5	-5	-3	-3	-2	4	6	1	-2	-4	-16	-23
2	-14	-10	-19	-29	-26	-21	-16	-11	-11	-15	-18	-16	-15	-15	-15	-14	-14	-12	-10	-13	-14	-15	-14	-12
3	-10	-12	-14	-12	-11	-10	-8	-5	-7	-8	-8	-9	-8	-7	-11	-21	-30	-24	-20	-20	-14	-22	-24	-21
4	-31	-42	-44	-57	-65	-62	-60	-56	-53	-39	-46	-57	-91	-96	-108	-108	-121	-111	-125	-115	-115	-112	-123	-126
5	-129	-127	-118	-109	-106	-104	-98	-93	-87	-87	-89	-88	-82	-76	-70	-67	-64	-61	-53	-45	-42	-33	-45	-47
6	-49	-31	-51	-64	-71	-54	-42	-45	-50	-50	-56	-53	-42	-45	-41	-36	-43	-44	-51	-53	-53	-55	-59	-50
7	-44	-38	-33	-32	-39	-45	-42	-40	-46	-50	-49	-48	-47	-46	-47	-44	-36	-35	-32	-28	-32	-32	-26	-24
8	-28	-30	-32	-32	-22	-17	-15	-4	10	13	-8	-21	-39	-41	-35	-35	-32	-31	-25	-25	-30	-30	-35	-35
9	-34	-33	-31	-36	-40	-39	-38	-39	-36	-33	-34	-35	-37	-35	-30	-27	-13	-12	-25	-31	-27	-40	-48	-60
10	-64	-66	-64	-42	-45	-51	-52	-52	-53	-49	-45	-44	-44	-43	-44	-48	-52	-48	-43	-38	-40	-43	-40	-41
11	-41	-40	-35	-33	-35	-35	-34	-35	-36	-34	-36	-39	-39	-39	-37	-37	-36	-33	-30	-29	-32	-34	-36	-35
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17	-58	-49	-42	-45	-43	-38	-33	-31	-29	-30	-29	-30	-28	-25	-25	-26	-26	-24	-21	-21	-21	-18	-22	-30
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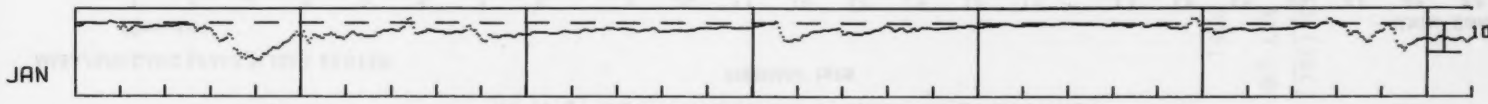

HOURLY EQUATORIAL Dst VALUES (PROVISIONAL)

NASA/GODDARD SPACE FLIGHT CENTER

FEBRUARY 1978

(Time-UT) (Units-Gammas)

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	-57	-56	-54	-55	-48	-43	-41	-42	-40	-40	-40	-40	-37	-38	-44	-40	-38	-38	-30	-28	-29	-29	-35	-42
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3	-33	-36	-39	-35	-38	-41	-43	-37	-37	-40	-38	-38	-38	-41	-39	-36	-41	-42	-42	-36	-34	-32	-26	-32
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9	-31	-27	-22	-21	-23	-25	-28	-35	-43	-57	-56	-65	-62	-56	-52	-50	-46	-45	-48	-50	-54	-47	-41	-43
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22	-72	-71	-73	-73	-72	-73	-71	-54	-43	-40	-38	-37	-32	-31	-32	-38	-53	-42	-34	-39	-38	-39	-37	-35
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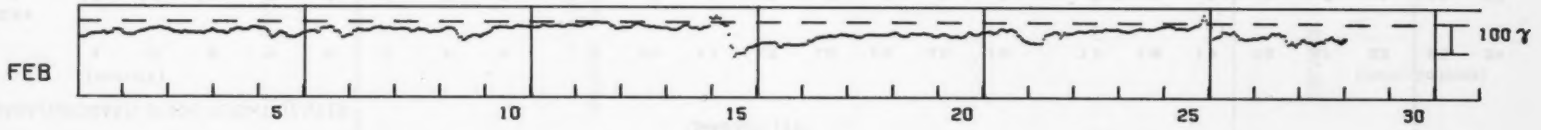
28	-58	-54	-61	-63	-64	-66	-71	-75	-64	-65	-61	-64	-66	-53	-52	-48	-43	-54	-59	-57	-64	-65	-59	-53



SUDDEN COMMENCEMENTS AND SOLAR FLARE EFFECTS

FEBRUARY 1978

PRELIMINARY REPORT ON RAPID MAGNETIC VARIATIONS (by Dr. A. Romaná)

The meaning of the station symbols is given in the IAGA-News No. 16.
Times of ssc are mean values.

Sudden commencements followed by a magnetic storm or a period of storminess (ssc).

14	2147	A: SOD DOB ESK WNG WIT DOU VIC FUR OTT AQU EBR COI TOL FRD KSA KNY LMN CZT PAF DRV; B: NGK HAD MMB KAK
25	1928	A: SOD DOB ESK WNG WIT DOU FUR OTT AQU EBR COI TOL FRD LMM CZT PAF; B: NGK HAD VIC MMB KAK KSA KNY DRV

Solar-flare effects (sfe).
Effects confirmed by ionospheric or solar observations are underlined.

06	1013 - 1032	SOD
09	1318 - 1337	EBR (si: A: FUR; B: TOL)
17	0312 - 0325	MMB
19	1055 - 1109	WNG
25	0304 - 0325	MMB KAK

Very unusual events.
None

UAG Series of Reports

Prepared by World Data Center A for Solar-Terrestrial Physics, NOAA, Boulder, Colorado, U.S.A.

These reports are for sale through the National Climatic Center, Federal Building, Asheville, NC 28801, Attn: Publications. Subscription price: $25.20 a year; $12.00 additional for foreign mailing; single copy price varies. These reports are issued on an irregular basis with 6 to 12 reports being issued each year. Therefore, in some years the single copy rate will be less than the subscription price, and in some years the single copy rate will be more than the subscription price. Make check or money order payable to: Department of Commerce, NOAA.

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UAG-12 "Solar-Geophysical Activity Associated with the Major Geomagnetic Storm of March 8, 1970", price (includes Parts 1-3) $3.00.
UAG-13 "Data on the Solar Proton Event of November 2, 1969 through the Geomagnetic Storm of November 8-10, 1969, price 50 cents.
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UAG-15 "Catalogue of Data on Solar-Terrestrial Physics" (now obsolete).

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UAG-17 "Ionospheric Drift Velocity Measurements at Jicamarca, Peru (July 1967-March 1970)", microfiche only, price 45 cents.
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UAG-31 "Auroral Electrojet Magnetic Activity Indices AE (11) for 1969", price 75 cents.
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UAG-39 "Auroral Electrojet Magnetic Activity Indices AE (11) for 1971", by Joe Haskell Allen, Carl C. Abston and Leslie D. Morris, National Geophysical and Solar-Terrestrial Data Center, Environmental Data Service, February 1975, 144 pages, price $2.05.

UAG-40 "H-Alpha Synoptic Charts of Solar Activity For the Period of Skylab Observations, May, 1973-March, 1974", by Patrick S. McIntosh, NOAA Environmental Research Laboratories, February 1975, 32 pages, price 56 cents.

UAG-41 "H-Alpha Synoptic Charts of Solar Activity During the First Year of Solar Cycle 20, October, 1964 - August, 1965", by Patrick S. McIntosh, NOAA Environmental Research Laboratories, and Jerome T. Nolte, American Science and Engineering, Cambridge, Massachusetts, March 1975, 25 pages, price 48 cents.

UAG-42 "Observations of Jupiter's Sporadic Radio Emission in the Range 7.6-80 MHz 10 December 1971 through 21 March 1975", by James W. Warwick, George A. Dulk, and Anthony C. Riddle, Department of Astro-Geophysics, University of Colorado, Boulder, Colorado 80302, April 1975, 49 pages, price $1.15.

UAG-43 "Catalog of Observation Times of Ground-Based Skylab-Coordinated Solar Observing Programs", compiled by Helen E. Coffey, World Data Center A for Solar-Terrestrial Physics, May 1975, 159 pages, price $3.00.

UAG-44 "Synoptic Maps of Solar 9.1 cm Microwave Emission from June 1962 to August 1973", by Werner Graf and Ronald N. Bracewell, Radio Astronomy Institute, Stanford University, Stanford, California 94305, May 1975, 183 pages, price $2.55.

UAG-45 "Auroral Electrojet Magnetic Activity Indices AE (11) for 1972", by Joe Haskell Allen, Carl C. Abston and Leslie D. Morris, National Geophysical and Solar-Terrestrial Data Center, Environmental Data Service, May 1975, 144 pages, price $2.10.

UAG-46 "Interplanetary Magnetic Field Data 1963-1974", by Joseph H. King, National Space Science Data Center, NASA Goddard Space Flight Center, Greenbelt, Maryland 20771, June 1975, 382 pages, price $2.95.

UAG-47 "Auroral Electrojet Magnetic Activity Indices AE (11) for 1973", by Joe Haskell Allen, Carl C. Abston and Leslie D. Morris, National Geophysical and Solar-Terrestrial Data Center, Environmental Data Service, June 1975, 144 pages, price $2.10.

UAG-48A "Synoptic Observations of the Solar Corona during Carrington Rotations 1580-1596 (11 October 1971 - 15 January 1973)", [Reissue with quality images] by R. A. Howard, M. J. Koomen, D. J. Michels, R. Tousey, C. R. Detwiler, D. E. Roberts, R. T. Seal and J. D. Whitney, E. O. Hulbert Center for Space Research, NRL, Washington, D. C. 20375 and R. T. and S. F. Hansen, C. J. Garcia and E. Yasukawa, High Altitude Observatory, NCAR, Boulder, Colorado 80303, February 1976, 200 pages, price $4.27.

UAG-49 "Catalog of Standard Geomagnetic Variation Data", prepared by Environmental Data Service, NOAA, Boulder, Colorado, August 1975, 125 pages, price $1.85.

UAG-50 "High-Latitude Supplement to the URSI Handbook on Ionogram Interpretation and Reduction", by W. R. Piggott, British Antarctic Survey, c/o SRC, Appleton Laboratory, Ditton Park, Slough, England, October 1975, 292 pages, price $4.00.

UAG-51 "Synoptic Maps of Solar Coronal Hole Boundaries Derived from He II 304Å Spectroheliograms from the Manned Skylab Missions", by J. D. Bohlin and D. M. Rubenstein, E. O. Hulbert Center for Space Research, Naval Research Laboratory, Washington, D. C. 20375 U.S.A., November 1975, 30 pages, price 54 cents.

UAG-52 "Experimental Comprehensive Solar Flare Indices for Certain Flares, 1970-1974", compiled by Helen W. Dodson and E. Ruth Hedeman, McMath-Hulbert Observatory, The University of Michigan, 895 Lake Angelus Road North, Pontiac, Michigan 48055 U.S.A., November 1975, 27 pages, price 60 cents.

UAG-53 "Description and Catalog of Ionospheric F-Region Data, Jicamarca Radar Observatory (November 1966 - April 1969)", by W. L. Clark and T. E. Van Zandt, Aeronomy Laboratory, NOAA, Boulder, Colorado 80302 and J. P. McClure, University of Texas at Dallas, Dallas, Texas 75230, April 1976, 10 pages, price 33 cents.

UAG-54 "Catalog of Ionosphere Vertical Soundings Data", prepared by Environmental Data Service, NOAA, Boulder, Colorado 80302, April 1976, 130 pages, price $2.10.

UAG-55 "Equivalent Ionospheric Current Representations by a New Method, Illustrated for 8-9 November 1969 Magnetic Disturbances", by Y. Kamide, Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, Colorado 80302 and Geophysical Institute, University of Alaska, Fairbanks, Alaska 99701, H. W. Kroehl, Data Studies Division, NOAA/EDS/NGSDC, Boulder, Colorado 80302, M. Kanamitsu, Advanced Study Program, National Center for Atmospheric Research, Boulder, Colorado 80303, J. H. Allen, Data Studies Division, NOAA/EDS/NGSDC, Boulder, Colorado 80302, and S.-I. Akasofu, Geophysical Institute, University of Alaska, Fairbanks, Alaska 99701, April 1976, 91 pages, price $1.60.

UAG-56 "Iso-intensity Contours of Ground Magnetic H Perturbations for the December 16-18, 1971 Geomagnetic Storm", by Y. Kamide, Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, Colorado 80302 and Geophysical Institute, University of Alaska, Fairbanks, Alaska 99701 (currently Guest worker at Data Studies Division, NOAA/EDS/NGSDC, Boulder, Colorado 80302), April 1976, 37 pages, price $1.39.

UAG-57 "Manual on Ionospheric Absorption Measurements", edited by K. Rawer, Institut für Physikalische Weltraumforschung, Freiburg, G.F.R., June 1976, 202 pages, price $4.27.

UAG-58 "ATS6 Radio Beacon Electron Content Measurements at Boulder, July 1974 - May 1975", by R. B. Fritz, Space Environment Laboratory (currently with Wave Propagation Laboratory), NOAA, Boulder, Colorado 80302 USA, September 1976, 61 pages, price $1.04.

UAG-59 "Auroral Electrojet Magnetic Activity Indices AE(11) for 1974", by Joe Haskell Allen, Carl C. Abston and Leslie D. Morris, National Geophysical and Solar-Terrestrial Data Center, Environmental Data Service, December 1976, 144 pages, price $2.16.

UAG-60 "Geomagnetic Data for January 1976 (AE(7) Indices and Stacked Magnetograms)" by J. H. Allen, C. C. Abston and L. D. Morris, NGSDC/EDS/NOAA, July 1977, 57 pages, price $1.07.

UAG-61 "Collected Data Reports for STIP Interval II 20 March - 5 May 1976", edited by Helen E. Coffey and John A. McKinnon, National Geophysical and Solar-Terrestrial Data Center, Environmental Data Service, August 1977, 313 pages, price $2.95.

UAG-62 "Geomagnetic Data For February 1976 (AE(7) Indices and Stacked Magnetograms)" by J. H. Allen, C. C. Abston and L. D. Morris, NGSDC/EDS/NOAA, September 1977, 55 pages, price $1.11.

UAG-63 "Geomagnetic Data for March 1976 (AE(7) Indices and Stacked Magnetograms)" by J. H. Allen, C. C. Abston and L. D. Morris, NGSDC/EDS/NOAA, September 1977, 57 pages, price $1.11.

UAG-64 "Geomagnetic Data for April 1976 (AE(8) Indices and Stacked Magnetograms)" by J. H. Allen, C. C. Abston and L. D. Morris, NGSDC/EDS/NOAA, February 1978, 55 pages, price $1.00.

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